



UNION OF SOUTH AFRICA

ANNUAL REPORT

OF THE

Department of Public Health

YEAR ENDED 30th JUNE, 1934

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DEPARTMENT OF PUBLIC HEALTH.

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Department of Public Health.

Report for the Year ended 30th June, 1934.

TO THE HONOURABLE THE MINISTER OF PUBLIC HEALTH,
PRETORIA.

I have the honour to submit herewith the report of the Department of Public Health for the year ended 30th June, 1934.

I.—INTRODUCTORY.

The consummation of Union in 1910 constituted a definite epoch in national health in South Africa, for it witnessed the replacement of the Health Departments of the four Colonies by a system of lay administration under the Department of the Interior, pending a solution being found to the difficulties created by the fact that public health was not mentioned in the South Africa Act.

During the eight or nine years after Union, therefore, it is not surprising that little progress was made in public health matters, and indeed, it is now generally admitted that there was definite retrogression.

Whether any particular problem was to be a Union or Provincial matter was uncertain, and could only be settled by inference and tacit arrangement between the Government and the Provinces. In one of the Provinces there was practically no public health law; in another, such laws had been enacted for a period and were allowed to lapse, and in all the Provinces there was doubt and confusion as to the scope and functions of the Union Government and Provincial Administrations, which inevitably led to overlapping, neglect and inefficiency.

Indeed, only one great advance can be recorded for this period, namely, the establishment in 1912 of the South African Institute for Medical Research under the control of a Board appointed jointly by the Witwatersrand Native Labour Association and the Government, to deal primarily with problems of health needing investigation on the gold mines of the Witwatersrand.

In 1914 the Report of the Tuberculosis Commission was published. The facts set out in that Report were somewhat alarming and resulted in an instruction being given for the preparation of a draft consolidating Public Health Bill for the Union. The Bill was published in 1916. It was not, however, proceeded with at once, and in 1918 a Conference was held at Bloemfontein, presided over by the then Minister of the Interior, at which the Bill was considered and a general understanding arrived at as to the respective functions of the Union Government and Provincial Administrations in matters of public health and local government, and as to the broad lines of policy to be followed in the new Bill.

The Conference was hardly over when South Africa was swept by a devastating epidemic of influenza, when some half-a-million European and two-and-a-half million Coloured and Native cases occurred, with approximately 12,000 European and 130,000 Coloured and Native deaths.

As a direct result of that epidemic, the consolidating Public Health Bill was introduced into Parliament and passed as Act No. 36 of 1919. The passage of this Act constituted another landmark in the history of public health in South Africa.

It was followed by the Housing Act (No. 35 of 1920) being placed upon the Statute Book, and later by the passing of the Public Health Act, 1919, Amendment Act, 1927, and the Public Health (Amendment) Act, 1928. The Act of 1927 allowed, *inter alia*, for the delegation of powers by the Minister and local authorities, while the Act of 1928 made provision whereby, within very restricted limits, conscientious objectors to vaccination could secure the exemption of their children from vaccination without causing any special danger to the community.

The Housing Act was amended by the Housing Act Amendment Acts (No. 5 of 1925) and (No. 68 of 1934).

In 1928, also, the Medical, Dental and Pharmacy Act, No. 13 of 1928, became law, which, besides consolidating the laws regarding medical practitioners, dentists, chemists and druggists, and nurses and midwives, placed

the sale and use of poisons and poisonous substances on a more satisfactory basis, and enabled the importation, sale and use of narcotic and habit-forming drugs to be regulated in conformity with international obligations.

The Food, Drugs and Disinfectants Act was passed during the first Parliamentary Session of 1929, and was promulgated as Act No. 13 of 1929.

The Public Health Act and supplementary public health legislation on the whole has worked smoothly and well, and has shown satisfactory and promising results in many directions, but it has by no means been as successful as was at one time hoped.

The underlying basis of the Public Health Act and the policy which has been steadily pursued in its administration is decentralisation, health matters of local concern being dealt with by the local authorities, in many cases with financial assistance on a defined basis by the State, with the Department advising, assisting, co-ordinating and, where absolutely necessary in the public interest, but not otherwise, coercing a defaulting local authority.

The Act for a number of reasons failed to achieve all that was hoped for in certain directions. The procedure for dealing with nuisances is a slow and cumbrous one, and though possibly advisable in small local authorities without specially qualified staff, is really unsuitable for the large towns, particularly when dealing with insanitary and overcrowded premises. It was largely for this reason that, during the 1934 Session a Bill was introduced into Parliament and passed into law as Act No. 53 of 1934 to make better provision for the elimination of slums within the areas of jurisdiction of certain local authorities, viz., Bloemfontein, Capetown, Durban, East London, Johannesburg, Pretoria, Port Elizabeth and Pietermaritzburg.

The main reason for the failure of the Public Health Act to achieve all that was hoped for, however, is that properly constituted local governing bodies have not been established throughout the area of each Province, and many of the bodies that have been established have not been financially strong enough to deal satisfactorily with matters vitally affecting the health of the people.

The Cape Province was endowed by the old Cape Parliament with a system of Divisional Councils to provide local government for rural areas. The system has been materially altered in certain respects by Provincial legislation since. These bodies with few exceptions have never been willing to function properly in the protection of the public health, and it is certain that most of them are incapable of acting properly as local health units. In the Transvaal, Orange Free State and Natal, rural local authorities do not exist, although Malaria Committees have been established in certain areas of Natal to deal specifically with the problem of malaria.

It is a regrettable fact that outbreaks of epidemic disease are as a rule dealt with more effectively in the rural areas of the Transvaal, Natal and Orange Free State by Magistrates acting under the authority and instructions of the Minister, than similar outbreaks are dealt with by the Divisional Councils of the Cape Province—with some seven or eight notable exceptions which are mostly situated in the Western Province.

But it is not in the rural areas alone that local health administration is unsatisfactory. In many of the urban areas there is one great and abiding obstacle to the provision of proper sanitary measures, namely the objection on the part of the community to the payment of sufficient rates for sanitary purposes. This is a difficulty which is usually greater in inverse ratio to the size of the local authority, for in small villages communal activity is less developed and the relative cost of sanitation is necessarily increased. The public seems to forget that good sanitation, like all other things, must be paid for; that if pure water is to be delivered to the dwelling-house, if adequate means are to be taken for removing night-soil and refuse, if streets are to be kept clean, if the spread of infectious disease is to be prevented, if the appallingly unhealthy conditions under which Natives and Coloured persons are permitted to live are to be rectified, these objects can only be achieved by the expenditure of money. Nevertheless it is not unusual for the revenue of towns and villages of some size to be so small as to be insufficient for carrying out any but the very minor duties of a local authority. This is a matter which is slowly being rectified largely as a result of the system of periodical inspections carried out by the Medical Officers of the Department.

Further, a large number of small municipalities, village management boards, health committees and local boards have been established in all four Provinces, which are—even when fully rated—unable to finance the duties imposed upon them by law. There are many local authorities with tiny incomes that cannot, for financial reasons, undertake the responsibilities imposed upon them—such as, for instance, dealing with cases of tuberculosis requiring sanatorium treatment.

These difficulties, as well as the need for a simpler and better co-ordinated organisation for administering and dealing with, on a broad national basis, local government, school medical matters, sanitation, housing, hospitals, and the midwifery and nursing needs of the people, have been clearly placed before the Provincial Finance Commission.

Without anticipating the finding of the Provincial Finance Commission, and assuming that the local units of health administration will remain as they are to-day, it is evident that there must be a reconsideration of some of the financial provisions of the Public Health Act. It has been suggested in some quarters that the whole expenditure on dealing with infectious diseases should be borne by the Central Government. It must be obvious that a policy of this nature would be unsound as the spread of many infectious diseases is fostered by insanitation and bad surroundings, for the continuance of which local authorities and Provincial Administrations are responsible.

It seems to me that in any readjustment of public health policy provision must be made for at least a broadening of the burden of local health expenditure so that the Provincial Administrations may be treated as local health units and compelled by law to carry a portion of the expenditure. Further, when a local authority refuses to admit an infectious diseases patient urgently requiring hospital treatment, it should be competent for the Department and also perhaps for the Provincial Administration to authorise his admission at the joint cost of the State, the Province and the local authority. This would, of course, involve an amendment of the Public Health Act in a direction which appears to be essential before such diseases as tuberculosis, and possibly venereal disease, can be properly controlled.

But after all the apathy of the local authority which is able, but fails, to discharge properly its public health functions, is in a large measure but a reflex of the apathy of the individual to the importance of sanitation and clean living. It is indeed a fact that although the general standard of domestic hygiene in South Africa is slowly improving it is still inferior to that observed in Holland and Great Britain from which the majority of the white inhabitants of the sub-continent is derived. Whether this is due to the enervating influence of the climate, to a deficiency of water or to the inferiority of the domestic labour supply or to lack of education in the most rudimentary matters of hygiene, or to all of these, the fact remains that the standard of cleanliness and cleanly living is low in many South African homes. I feel that, until the fundamentals of health promotion and of right living are properly taught in our schools and these subjects are actually made examination subjects and not skipped in the class rooms as they are at present, progress in public health will continue to lag.

For a number of years after the passing of the Public Health Act the health of the people—in spite of defects in the Act, the inadequate financial provision made for the department, the constitutional difficulties under which it has had to function and the lack of proper education in hygiene—showed on the whole indisputable signs of steady improvement which could not fail to contribute to their increased capacity and longer life. But the long period of financial depression, now happily ended, did more than slow up this improvement; in certain respects there was definite retrogression though it is impossible to state as yet to what extent the economies of recent years in domestic, local authority, Provincial and Union budgets will adversely affect the vital statistics of the nation in the future. As far as the non-European population is concerned we shall never know—owing to the absence of proper births and deaths registration—what exactly has happened. We know that very large numbers of natives were for long periods desperately short of food, and the increased prevalence of typhus—an almost sure indication of severe economic stress—amongst these people during the year under review, and at present, is sufficient to show how badly many non-Europeans have been faring. It is to be hoped that whatever policy may be adopted to assist the growers of essential foodstuffs in the future, provision will be made at least to ensure that sufficient reserves are retained in South Africa to enable the non-Europeans to obtain their requirements at a price within their means when their own crops fail.

In spite of the prevalence of typhus, however, the Health Year ended the 30th June, 1934, constitutes another definite epoch in the history and evolution of public health in South Africa for it has witnessed a recognition by Parliament of the increasing public appreciation of the claims and necessities of preventive medicine and an awakening by the public generally to the medical and nursing needs of the people.

As will be seen from succeeding sections of this report, additional funds have been provided by Parliament to enable many of these needs to be dealt with in whole or in part. Thus district surgeons' emoluments are now being adjusted and further appointments are being made; a woman medical

officer and three nurse-lecturers have been appointed to assist in educating rural mothers with the object ultimately of providing an inspectorate staff for a district nursing service throughout South Africa, for which the women voters of the country are now commencing to clamour. A Serologist has been appointed to undertake the biological examination of therapeutic substances, including certain drugs which require standardisation by these methods. A commencement is to be made this financial year with the enlargement of Nelspoort Tuberculosis Sanatorium, and steps are being taken to provide tuberculosis clinics in the larger centres of population and hospital accommodation for advanced cases of tuberculosis in the different Provinces. Additional funds have also been provided for dealing with malaria; a commencement is about to be made for the training of Native medical aids; and lastly, the medico-legal arrangements in Johannesburg have been reorganised by the appointment as from the 1st January, 1934, in conjunction with the University of the Witwatersrand, of a medico-legal pathologist and assistants to advise in crown cases, who also hold the posts of Professor of Forensic Medicine and lecturers in that subject, respectively, at the University. Somewhat similar arrangements have been made in respect of Capetown, to take effect from the 1st August, 1934.

The carrying-out of the above projects will involve in themselves a considerable annual increase in public health expenditure, but there are other matters connected with the public health of the nation which also urgently demand attention. These may be stated to be the following:—

- (1) The introduction, with as little delay as possible of a subsidised district nursing service throughout the Union.
- (2) The provision of additional funds to enable venereal diseases to be energetically tackled throughout the Union. At present it is doubtful whether we are doing more than barely holding these diseases in check and there can be no doubt but that the native labour of the country, which is so essential at least for the development of the mines, will be gravely restricted in future if more energetic measures are not instituted to cope with these diseases, which—apart from causing incapacity, crippledom and suffering, often to innocent persons—are unquestionably adversely affecting the rate of increase amongst non-Europeans by causing miscarriages, barrenness, and infantile deaths.
- (3) The strengthening of the professional staff of the Department by the appointment when a vacancy occurs as it soon will amongst the Assistant Health Officers, of a specially trained Tuberculosis Officer for inspectional duties and the appointment of a further Assistant Health Officer additional to the present staff specially trained in the prevention of venereal diseases together with corresponding increase in the lay staff who can barely cope with present duties.
- (4) The institution of a system of births and deaths registration amongst non-Europeans.
- (5) An amendment of the Public Health Act to broaden the burden of local authorities in dealing at any rate with the problem of tuberculosis.

The most urgent needs in local authority areas may again be summarised as follows:—

- (a) In the large towns—the provision of additional houses, particularly for the needs of the poorer sections of the community, and generally for dealing with overcrowding and unhealthy areas.
- (b) In smaller towns of any considerable size—the appointment of whole-time medical officers of health, if necessary in co-operation with the Government under section *seventeen* of the Public Health Act, by the amalgamation of existing part-time medical appointments and the establishment of clinics in connection with maternal and infant welfare as well as for tuberculosis and venereal diseases.
- (c) In small towns and villages—the appointment of qualified health inspectors in lieu of untrained personnel.
- (d) More attention generally to the disposal of night-soil, refuse and manure (especially horse manure), and the prevention of fly-breeding in most urban centres and on farms.
- (e) Better supervision of dairies and the elimination of typhoid “carriers” from dairies and other places in which milk and foodstuffs are handled.

In regard to the urgent requirements of some of the large towns in particular, the following remarks may be made:—

- (1) *Capetown* needs to initiate a scheme of slum clearance and the construction of a large number of additional dwellings. Further the milk supply of the inhabitants should be reorganised.
- (2) *Johannesburg* also ought to undertake a scheme of slum clearance and the initiation of building schemes for the benefit of the poorer sections of the community.
- (3) *Bloemfontein* has no real slum areas, but a considerable number of unfit dwellings. The most urgent health need of this local authority lies in the enforcement of the rat-proofing regulations.
- (4) *Durban* needs to undertake slum clearance. Further it will require a continuous campaign to eliminate completely the menace of malaria.
- (5) *Pietermaritzburg* has to face the elimination of slums in the Camp drift area and should develop Health Visiting and Child Welfare work amongst non-Europeans.
- (6) *Port Elizabeth* has a large amount of slum clearance to face as well as the augmentation and improvement of its water supply and the erection of a better abattoir.
- (7) *Pretoria* will have to undertake a clearance of slum-dwellings, an extension of its drainage scheme and more extended provision for the housing of non-Europeans.
- (8) *Kimberley* has many unfit dwellings and the opportunity should be taken while the demand for housing is low owing to the depression in the diamond trade to eliminate those which are definitely unfit for human habitation.
- (9) *Kingwilliamstown* has two non-municipal locations, Brownlee and Ridsdel, the closing of which is imperative.
- (10) *Grahamstown* still has a primitively conducted pail night-soil service. The introduction of water-borne sewerage is urgently needed in the interests of the general health of the community.
- (11) *East London* has unsatisfactory housing conditions particularly in the North End and the control of its milk supply is capable of improvement.
- (12) *The Large Municipalities on the Reef* (other than Johannesburg) should appoint and employ whole-time Medical Officers of Health, who have specialised in preventive medicine.

II.—VITAL STATISTICS.

The following table summarises the salient features of the vital statistics of the European population for each calendar year since 1920:—

TABLE A.—UNION OF SOUTH AFRICA: SUMMARY OF VITAL STATISTICS OF EUROPEAN POPULATION, 1920-1933.

Calendar Year.	European Population (estimated).	Birth Rate per 1,000 of Population.	Death Rate per 1,000 of Population.		Death Rate per 100,000 of Population from			Percentage of Total Deaths, the Cause of which was Medically Certified.	Infantile Mortality Rate (Deaths of Infants under One Year per 1,000 Live Births Registered).	Maternal Mortality Rate (Deaths of Mothers in connection with Pregnancy or Childbirth per 1,000 Live Births Registered.)	Survival Rate or Rate of Natural Increase (Excess of Births over Deaths per 1,000 of Population).
			Actual or Crude.	Standardized.*	Diseases of Heart and Circulatory System.	Pneumonia and Bronchitis.	Cancer.					Tuberculosis (all forms).§
1920.....	1,499,911	28.97	11.09	12.15	95.67†	113.87†	58.94†	46.00†	79.78	4.10†	17.88
1921.....	1,519,488†	28.44	10.41	11.43	102.91	136.15	69.09	58.26	80.76	4.94	18.03
1922.....	1,556,241	27.52	9.48	10.41	97.99	127.24	70.88	47.74	82.96	5.21	18.04
1923.....	1,579,733	26.70	9.77	10.65	108.50	120.72	78.94	46.46	82.77	5.22	16.93
1924.....	1,610,774	26.29	9.62	10.44	123.92	123.79	76.36	51.59	84.74	4.75	16.67
1925.....	1,637,472	26.51	9.39	10.15	128.86	97.04	72.86	52.70	86.45	5.62	17.12
1926.....	1,676,660†	26.16	9.59	10.28	127.21	113.44	71.18	53.41	87.76	4.56	16.57
1927.....	1,708,955	25.95	9.73	10.34	122.76	110.42	73.20	50.50	89.93	4.80	16.22
1928.....	1,738,937	25.77	10.15	10.69	133.53	127.72	77.52	50.95	89.93	4.98	15.62
1929.....	1,767,719	26.15	9.51	9.98	127.11	104.04	77.44	45.37	90.19	5.26	16.64
1930.....	1,797,900	26.44	9.69	10.08	132.33	112.87	82.62	46.76	91.15	5.26	16.75
1931.....	1,829,300	25.38	9.37	9.56	131.53	103.75	85.55	44.22	90.46	4.70	16.01
1932.....	1,859,400	24.17	9.97	9.98	137.52	113.75	89.06	42.33	90.84	5.31	14.20
1933.....	1,890,300	23.70¶	9.35	||	142.52	100.30	95.33	40.68	||	4.78¶	14.36¶

* The rate which would have obtained had the age and sex distribution of the population been the same as that of England and Wales at the 1901 census, the standard usually taken for international comparisons.

† Medically certified deaths only. Rates for subsequent years calculated on total deaths registered.

‡ Actual (per census).

§ Includes Miners' Phthisis combined with Pulmonary Tuberculosis.

|| Figures not yet available.

¶ Preliminary.

The birth rate, 23·70 shows a further fall; it is the lowest yet recorded for the Union, and is 1·88 lower than the average for the previous five years. The death rate decreased from 9·97 in 1932 to 9·35 in 1933 which is 0·39 lower than the average for the last five years. The infantile mortality rate also decreased from 68 to 60, and is thus well below the average for the last five years, which is 66 per thousand.

The following information and comparisons in respect of Europeans with other countries, supplied by the Director of Census and Statistics, are of special interest:—

Population of the Union—Estimates as at 30th June, 1933.—European, 1,890,300; non-European, Bantu, 5,681,100; Asiatic, 196,400; mixed and other coloured, 602,200; total non-European, 6,479,700. The European estimates are calculated on the average annual increases between the two last census, together with the annual records of births, deaths and migration. The non-European estimates are based on the 1921 census, and the average annual increase between 1911 and 1921.

The following vital rates for various countries including the Union recorded in the latter for Europeans only are average rates for three-yearly periods.

Birth Rates.—Union of South Africa, 24·42; Portugal, 30·6; Greece, 30·1; Bulgaria, 31·2; Lithuania, 27·1; Italy, 25·7; Canada, 23·7; Australia, 19·5; U.S.A., 19·8; New Zealand, 18·7; France, 17·7; Germany, 17·1; England and Wales, 16·1; Holland, 22·7.

Death Rates.—Union of South Africa, 9·56; Australia, 9·0; New Zealand, 8·6; Germany, 11·6; England and Wales, 12·4; Belgium, 13·9; Italy, 15·0; France, 14·7; Lithuania, 16·2; U.S.A., 11·8; Portugal, 17·6; Canada, 10·8; Holland, 9·8.

Infantile Mortality Rates.—Union of South Africa, 64; New Zealand, 34; Australia, 47; Holland, 53; England and Wales, 67; France, 83; Germany, 89; Canada, 89; Belgium, 95; Italy, 122; Portugal, 148; Lithuania, 159.

Survival Rate or Rate of Natural Increase.—Union of South Africa, 14·86; Portugal, 13·0; Holland, 12·9; Canada, 12·9; Italy, 10·7; Australia, 10·5; New Zealand, 10·1; U.S.A., 8·0; Germany, 5·1; England and Wales, 3·7; France, 3·0.

It will be seen from the above table that only essential information for 1933 has been made available in respect of European deaths. There is a real need in South Africa for the preparation of vital statistics affecting all races and not merely Europeans only. Notification of non-European births and deaths is compulsory only in urban areas, and in many of these owing to the large proportion of non-European male adults temporarily resident as labourers and to other circumstances, computations of death rates and similar statistics are useless or misleading.

It is greatly to be regretted that owing to lack of funds it was not possible even to enumerate the non-European population at the last census. The only reliable figures available for the non-European population are those of the decennial census enumerations, the last of which took place in 1921, when the figures were:—Bantu, 4,697,813; Asiatic, 165,731; mixed and other coloured, 545,548; Total, 5,409,092.

It would seem to be essential to know exactly the position in regard to the non-European population if only from the standpoint of being able to judge how far the Union itself is likely to be able to meet from its own resources in the future the ever-increasing demand for unskilled labour on the gold mines.

III.—ADMINISTRATIVE MATTERS.

1. *Staff.*—The organisation and functions of the Department and its principal personnel as at 30th June, 1934, are set out in Annexure "A".

The reorganisation which was announced in last report whereby one post of Assistant Health Officer was abolished and a post of Under Secretary created has worked well. It has resulted in the saving of much time on the part of professional officers who previously had to concern themselves to a considerable extent with clerical matters. The heavy increase, however, in work at Headquarters necessitated by the forward health policy inaugurated by the Government calls for an early augmentation of the professional and lay staff of the Department. The continued serious ill-health of Dr. W. A. Murray, Senior Assistant Health Officer at Pretoria, has throughout the year thrown an increasing strain on the other professional officers. Dr. Murray is due to retire on pension in December, 1934.

Dr. E. H. Cluver was transferred to head office in November, his duties in Johannesburg being taken over by Dr. L. Fourie, previously of the Durban Office. Mr. C. N. Millard retired on pension in September, 1933, and was succeeded in the post of chief clerk by Mr. A. Stuart, the post of principal clerk in charge of the infectious diseases branch which he vacated being filled by Mr. P. I. Phelan.

The staff in Natal has been considerably strengthened to deal with the serious menace of malaria in that province. In 1932 an additional Assistant Health Officer was stationed in Durban. Last October Dr. A. L. Ferguson was appointed as a Government Medical Officer for Malaria in the Natal area. Three additional Sanitary Inspectors for malaria work, bringing their number to six, have also been stationed there. The supervision of anti-malaria work carried out by local authorities, Malaria Committees and Voluntary Committees and the inauguration of focal schemes in the Native Reserves involving the supervision of the work of a very large number of native assistants is proving too much for these officers, and provision has been made on the current estimates for the increase in the number of Sanitary Inspectors for Malaria in Natal to nine.

As foreshadowed in my last report a section has now been formed in the Department for dealing with infant and maternal welfare staffed by Dr. Marion Thomson, M.B., Ch.B., D.P.H., D.T.M., and three nurse lecturers Misses K. S. Martin, P. H. L. Meier and E. B. Viljoen.

Arrangements have also been made for another much needed section of the Department to be provided, viz., one for supervising by assay and other means therapeutic substances imported into or manufactured within the Union. It was not possible to utilize any of the private or semi-public laboratories in the country for this purpose, since it would have been manifestly undesirable to place any such institution in the position of having to be an official critic of the work of competitor institutions. Apart from such institutions, there was no suitably qualified person available in the Union for placing in charge of this work which is very highly specialised. He had therefore to be sought for overseas. The Department had the assistance of the British Ministry of Health in making a selection from the overseas applicants. The officer appointed is Dr. M. H. Finlayson, M.B., Ch.B., B.Sc., of the Lister Institute, London. He was appointed Specialist Serologist as from the 1st May, 1934. It was, however, considered advisable by the experts in Great Britain that he should be given an opportunity of gaining experience in certain of the aspects of the work which will be required of him in South Africa. He has, therefore, been seconded for a period of six months to make a special study of the large-scale production of therapeutic substances as well as their standardization and assay. This was arranged for him by officials of the British Ministry of Health to take place at the serological and drug assay institutes controlled by the Ministry, at Copenhagen in Professor Madsen's Laboratory, at Marburg with Professor Schmidt, at Frankfurt with Professor Kille and at Paris.

The progressive policy which is being pursued in regard to combating tuberculosis will render necessary the appointment of an administrative officer specially trained in tuberculosis work. It is recommended that such an appointment be made when Dr. Murray retires at the end of 1934.

If any real headway is to be made in combating venereal diseases in the country a much more energetic policy will be necessary than has been practicable in the past on account of lack of funds. To co-ordinate this work the appointment of a specialist Assistant Health Officer additional to the present staff of the Ministry will be essential. Such an officer was actually appointed in 1920 in the person of the late Dr. Reith Frazer, but with the advent of bad times he was permitted to resign. If the appointment of specialist officers for tuberculosis and venereal diseases is agreed to it will be possible for the work of the Department to be sectionalized to a much greater extent than formerly, and greatly increased efficiency will necessarily result.

2. *Co-operation with Universities.*—The mutual advantage to the two Universities with Medical Schools and the Government Health Department of a co-ordination of the academic work on the one side and the administrative work on the other has long been realized. Until recently such co-ordination was rendered almost impossible mainly by vested interests. But co-operation to a very considerable extent and to a great mutual benefit has now been rendered possible with regard to the teaching of preventive medicine at the University of the Witwatersrand and of forensic medicine at both Medical Schools.

Two years ago the University of the Witwatersrand approached this Department with a view to its officers undertaking the public health teaching of the under-graduate and post-graduate medical students. A team of teachers under the Secretary for Public Health as Honorary Professor was arranged.

This team consisted of various specialists within and outside of the Department. As the Department already had an Assistant Health Officer stationed in Johannesburg the organisation was greatly simplified. In this arrangement the University has the great advantage that its students are trained by a number of experienced specialists actually engaged in almost every aspect of public health administration. The Government profits by being able to guide at the local University the public health training of future practitioners who are the most important bricks in the public health structure of the country. An even more direct advantage results perhaps from the fact that this Department is closely associated with the teaching for the Diploma in Public Health. A Diploma in Public Health must, of course, be held nowadays by all full-time medical officers of health of local authorities and by all Assistant Health Officers in the Department as well as by most of its other specialist officers. Lastly there is the generally admitted benefit which teaching a subject confers on persons who have to do executive work in connection with that subject. The other important branch of medicine in which co-operation between University and Government was very desirable and almost essential was Forensic Medicine. To be able to afford an officer with the best qualifications and experience the University and Government had necessarily to combine. For many years the University of the Witwatersrand had been negotiating with a view of obtaining a teacher who would devote the whole of his time to, and make a scientific study of, this important subject, collecting material from the valuable sources available in the Johannesburg area and gradually building up a medico-legal museum which would be of high international standing. The Government work too was not being done to the best advantage. The medico-legal work was being carried out in Johannesburg by five busy private practitioners who gave a small part of their time to work at the Government mortuary where numerous *post-mortem* examinations have to be carried out daily, and all the other criminal work which involved investigation by medical men. One of these practitioners in addition gave the teaching in this subject to the medical students at the University. While the Department is very grateful to these doctors who for many years have served it under great difficulties, and, considering the circumstances, very well, the arrangement was patently unsatisfactory, and was not in many cases serving the ends of justice. For this a full-time specialist was necessary.

A reorganisation was rendered possible by two of the five district surgeons having reached the age of retirement and a third handsomely undertaking to resign both from his Government appointment and his professorship at the University. The five part-time district surgeoncies and the part-time post of medical officer to the Native Affairs Department in Johannesburg were abolished, and three full-time officers appointed to do the Government and University work as from the 1st of January, 1934. The senior officer is Government Medico-legal Pathologist and Professor of Forensic Medicine at the University. The next officer is District Surgeon and Senior Lecturer in Forensic Medicine, and the junior officer is Assistant District Surgeon and Junior Lecturer in Forensic Medicine. The officers appointed to the posts were respectively, Dr. R. H. MacKintosh, Dr. P. C. Eagle and Dr. A. C. Melzer. As the Government work has increased considerably of late, it has been decided to appoint a further full-time officer as Additional District Surgeon as from the 1st of August, 1934.

The obvious advantage in a large town of having specialised full-time officers to do the Government and University Medico-legal work was promptly appreciated at Capetown. At the Congress of the Medical Association of South Africa held in Capetown in September, 1933, it was unanimously resolved "That Government be requested to extend to Capetown the same facilities for teaching and practice of forensic medicine that have been granted to the Witwatersrand". On that resolution being communicated to the University of Capetown, the Council of that institution made the necessary financial provisions and itself requested the Government to make arrangements similar to those which had been made so successfully at Johannesburg. It was accordingly arranged to abolish certain part-time Government posts, and, jointly with the University of Capetown, to create certain specialist posts. The reorganisation has now been finally approved, and will take effect from the 1st of August, 1934. The officers occupying the various new posts created will be as follows:—

Dr. W. F. Rhodes, Senior Pathologist to the Capetown Government Laboratory to be appointed to the Chair of Forensic Medicine at the University. For many years District Surgeons in the Western Province have sought Dr. Rhodes' assistance in difficult cases and indeed in many cases the Police themselves have sought his advice and assistance. This is now more readily and formally available for he and his assistants will be responsible for all *post-mortems* in at least the Capetown and Woodstock areas. He will be assisted in both his Government medico-legal work and in his University work by—

Dr. R. Turner who is being appointed Assistant Pathologist and Senior Lecturer in Forensic Medicine at the University, and

Dr. C. A. M. Murray who is to be Additional Assistant Pathologist and Junior Lecturer in Forensic Medicine at the University.

Dr. A. A. Louw, the full-time District Surgeon at Capetown is to be Lecturer in Vaccination at the University, and Dr. R. H. Purcell has been appointed whole-time Assistant District Surgeon for Capetown, replacing the part-time District Surgeon, Woodstock, and the part-time Medical Officer at the Castle.

Previous to the arrangements above alluded to, this Department had already had the co-operation of the University Medical Schools in the provision of refresher courses for District Surgeons. Another such course was held at the University of the Witwatersrand in February, 1934. It was attended by twenty-eight district surgeons drawn from various parts of all four provinces. The relatively poor attendance this year compared with the courses held in previous years was to be attributed solely to the financial stringency which almost every country practitioner had experienced during the past two years. The Department pays the University for the course and actually provides the cost of the railway fare of the district surgeons attending. But all other expenditure, including provision for the carrying on of their practices, has to be met by the officers concerned. Actually, under the circumstances the number attending in 1934 was reassuringly large. The President of the District Surgeons' Group of the Medical Association of South Africa who himself attended, in reporting on the course expressed in very appreciative language the gratitude of his colleagues "for the really excellent Post Graduate Course". The lectures and demonstrations were provided as in previous years by specialist officers of the University and of the Government.

3. *District Surgeons.*—In addition to the full-time district surgeoncies created in Johannesburg and Capetown in connection with the reorganisation necessitated by the scheme for co-operation with the Universities further part-time posts were created as follows:—

In the Cape Province, Additional District Surgeoncies at Citrusdal and Warrenton;

In Natal, District Surgeoncies at Mahlabatini, Msinga and Ubombo;

In the Orange Free State an Additional District Surgeoncy at Tweeling;

In the Transvaal, District Surgeoncies at Brakpan and Naboomspruit, and Additional District Surgeoncies at Coligny, Swartwater, Sibasa and Thaba Zimbi.

In all four Provinces the establishment of further posts was still under consideration on the 30th June, 1934.

The present distribution of district surgeons is set out in Table "B".

TABLE B.—DISTRICT SURGEONCIES AND ADDITIONAL DISTRICT SURGEONCIES AS AT 30TH JUNE, 1934.

Province.	Whole-time.	Whole-time, but jointly with local authority or public body.	Part-time.		Total.	
			On inclusive annual salary.			On annual salary with certain supplementary fees and allowances.
			District Surgeons.	Additional District Surgeons.		
Cape.....	4	3	—	9	138	154
Natal.....	3	—	—	1	42	46
Transvaal.....	4	—	2	12	56	74
Orange Free State..	1	—	—	12	46	59
UNION.....	12	3	2	34	282	333

The twelve whole-time officers are those at Capetown (2); Durban (3); East London, Port Elizabeth, Pretoria (2); Johannesburg (2); and Bloemfontein.

4. *Local Authorities and their Health Staffs.*—The numbers of the various classes of local authorities under the Public Health Act as at 30th June, 1934, are shown in Table "C".

TABLE C.—LOCAL AUTHORITIES UNDER THE PUBLIC HEALTH ACT (1919)
AS AT 30TH JUNE, 1934.

Province.	Municipalities.	Village Management Boards.	Local Boards.	Village Councils.	Health Committees.	Local Administration & Health Boards.	Magistrates.	Divisional Councils.	Board of Health.	Mining Commissioners.	Total.
Cape.....	130	91	24	—	—	—	29	94	1	1	370
Natal.....	11	—	15	—	18	7	44	—	—	—	95
Transvaal.....	27	—	—	31	36	—	41	—	—	3	138
Orange Free State	61	7	—	—	—	—	38	—	—	1	107
UNION.....	229	98	39	31	54	7	152	94	1	5	710

Whole-time Medical Officers of Health are employed by only nine of the local authorities listed, namely, the Municipalities of Bloemfontein, Capetown, Durban, East London, Johannesburg, Pietermaritzburg, Port Elizabeth and Pretoria, and the Divisional Council of the Cape. The Kimberley Board of Health has a medical officer who devotes some of his time on behalf of the Kimberley Municipality and some to laboratory work at the Kimberley Hospital, but does no private practice. The question of his formal appointment under section *twelve* of the Public Health Act by the two local authorities acting jointly so as to enable the Government to contribute to his emoluments under section *two* of Act No. 15 of 1928 has been under discussion during the year and it is expected that a satisfactory settlement will be reached shortly. At Grahamstown and Queenstown there are whole-time officers who carry out the combined duties of District Surgeon and Medical Officer of Health to the Municipal and Divisional Council.

The smallness of the number of local authorities served by medical men who have specialised in preventive medicine is to be deplored. Our larger towns all need continual expert guidance in public health matters. In the past it may have been impracticable for various reasons to make the necessary professional appointments, but these reasons have now fallen away. In particular both the Medical Schools of our Universities now provide post-graduate courses in public health, and doctors holding the Diploma in Public Health are passing out from these Universities annually. There is, therefore, a satisfactory supply of qualified persons to select from in the Union.

Johannesburg was still the only Reef Municipality which, during the period under review, had a properly organized public health service with a full-time Medical Officer of Health at its head. Local authorities in whose areas are located the most flourishing industry of the Union can surely offer no excuse for a continuation of such an unsatisfactory position. Vested interests often of quite subsidiary importance should no longer be allowed to stand in the way of an organization for adequately guarding the health of the community entrusted to a local authority.

This Department is urging the appointment of full-time specialised officers wherever this is reasonably possible. In the case of the Reef Municipalities it has offered to assist financially by combining the posts of Medical Officer of Health and District Surgeon for the latter of which the Government is directly responsible. Though it is unquestionably necessary for these towns to have full-time officers, it is sincerely to be hoped that if this is considered impracticable for any reason at present, they will at least accept the offer of making a combined full-time appointment of an officer qualified in preventive medicine. The only Reef town which has so far accepted the offer is Germiston which has recently called for applications for a Medical Officer of Health who will also be District Surgeon for the area.

If any special argument were needed to prove the necessity for these towns improving their health services to the extent at least of employing a qualified Medical Officer of Health, it is provided by the very high incidence among them of the preventable disease, typhoid, during the past summer. The reply usually given by the local authorities concerned when pressed on the matter, that their sanitary inspectors are rendering good

service is beside the point. These officers, however conscientious, are not medically trained, cannot be expected to recognise diseases in their early stages, cannot be expected to anticipate epidemics by recognising premonitory signs, cannot conduct and supervise the various clinics which no modern town can afford to be without and cannot attend to the numerous other matters which only a medical man trained in preventive medicine can undertake. These cannot be undertaken satisfactorily either by a sanitary inspector untrained in medicine or a medical practitioner untrained in sanitary science who is moreover usually engaged in a busy private practice.

The number of certificated sanitary inspectors employed by local authorities is increasing. On the 30th June, 1934, those employing such officers devoting the whole of their time to sanitary work were 92 in number, namely, 44 in the Cape, 9 in Natal, 13 in the Orange Free State and 26 in the Transvaal. The total numbers of such persons are: Sanitary Inspectors, 253 and Health Visitors 17. These officers are very necessary in all organized communities. Numbers of young men are taking the training prescribed by the Union Government and the Royal Sanitary Institute. A very good type of candidate is entering for the sanitary inspectors examination and on account of the large number of candidates and the relatively few posts available it was recently decided to raise the standard of the examination which was already much stiffer than the corresponding examination in Great Britain. On the other hand the supply of trained health visitors is only about equal to the demand.

IV.—WORK OF THE DEPARTMENT.

1. *Inspections, Investigations and Field Work.*—This important side of the Department's work was very severely limited by the shortage of staff. Only in connection with malaria prevention can the amount of work done be considered reasonably satisfactory. For several years past the extremely important work of guiding and supervising the activities of the smaller urban local authorities has had to be almost entirely discontinued because of financial stringency. There are 430 such local authorities which it was the aim of the Department to have inspected at least once every three years by Health Officers to obviate the development of serious hygienic faults. Last year only 26 of these were inspected, the number inspected the year before having been only 22. It is urgently necessary for this very important side of the Department's activities to be resumed without delay. The proposed increase in staff will make this possible.

2. *Publications by Members of Staff.*—

SIR E. N. THORNTON, *Chief Health Officer.*

"The Medical and Health Aspects of Aviation in the Union." S.A. Medical Congress, October, 1933.

DR. G. A. PARK ROSS, *Senior Assistant Health Officer.*

"Some Remarks on Ship Fumigation at the Port of Durban." (With W. A. Larmuth, African Explosives and Industries, Ltd.) *Journal of the Royal Sanitary Institute*, Vol. LIV, No 1., July, 1933.

DR. E. H. CLUVER, *Assistant Health Officer.*

"Public Health in South Africa." Text book for students in public health, published by Central News Agency, Johannesburg.

"Diet in Relation to Public Health." Paper read at Plenary Session of the 27th South African Medical Congress, Cape Town, 25th September, 1933. (Published in the *S.A. Medical Journal*, Vol. VIII, No. 1, 13th January, 1934.)

"Statistics of Cancer." *S.A. Medical Journal*, Vol. VII, No. 24, 23rd December, 1933.

"Prevention of Urinary Bilharziasis in the Union." *S.A. Medical Journal*, Vol. VIII, No. 9, 12th May, 1934.

In addition to the scientific publications enumerated above numerous addresses on public health subjects were delivered by members of the staff to gatherings convened by local authorities and other organisations.

3. *Health Publicity and Educative Work.*—In Annexure B, pamphlets and leaflets which have been prepared, published and distributed by the Department to date, are furnished.

The following cinema films are owned by the Department and are available to local authorities and public bodies for exhibition purposes:—

- "The Rat Menace."
- "Swat that Fly."
- "Fly Danger."
- "Your Mouth."
- "The Story of John McNeil" (tuberculosis).
- "The War on the Mosquito."
- "How to Live Long and Well."
- "One Scar or Many" (vaccination).
- "In His Father's Footsteps" (insanitary farm-typhoid).
- "The Long versus the Short Haul" (dirty milk).
- "Bringing it Home" (child welfare).
- "Bilharziasis."
- "Malaria."

A set of small models, specially made for the Department by a health inspector who is also a clever handyman, is stocked by the Department's health officers at Pretoria, Capetown, and Durban for loan to local authorities and other bodies for demonstrations during "health weeks" and on similar occasions, and for illustrating lectures on hygiene. Each set includes a model for illustrating—

- (1) method of rodent-proofing buildings;
- (2) an "open-air" room for home segregation of a tubercular patient;
- (3) Baber's maggot-traps;
- (4) Russell's modified maggot-trap;
- (5) Russell's modified box fly-trap;
- (6) Squatting closet for native use.

The Department owns an up-to-date epidiascope with portable electric generator for its propagandist campaign—also lantern slides and three magic-lanterns. It is hoped to increase educative work in connection with campaigns against malaria, plague, bilharzia, and fly-borne disease and general insanitation, so as to ensure the co-operation of an enlightened public.

4. *Laboratories.*—The work done by the Government Laboratories at Capetown and Durban and that carried out on behalf of the Government at the South African Institute for Medical Research, Johannesburg, and at Port Elizabeth is shown in Table D.

TABLE D.—PATHOLOGICAL LABORATORIES: ANALYSES AND EXAMINATIONS, YEAR ENDED 30TH JUNE, 1934.

Particulars.	Laboratories.		South African Institute for Medical Research.	
	Capetown.	Durban.	Jo-hannesburg.	Port Elizabeth Branch.
<i>Specimens Examined for—</i>				
Government Departments—				
Agriculture.....	27	83	—	—
Customs and Excise.....	485	—	85	—
Defence.....	668	49	803	—
Interior (Mental Hospitals, etc.).....	971	163	952	101
Justice.....	—	352	1,433	—
Justice (Prisons).....	847	348	736	19
Mines and Industries (including Miners' Phthisis).....	—	—	11,469	—
Posts and Telegraphs.....	68	—	—	—
Public Health (including Leper Institutions).....	8,941	23,193	38,806	5,832
Public Works.....	—	—	—	—
South African Railways and Harbours	156	4,548	—	—
Other Government Work.....	—	120	443	48
General Hospitals (Provincial).....	2,297	7,495	34,440	5,253
Local Authorities.....	30,582	25,651	4,412	13,409
Medical Practitioners.....	10,282	14,458	15,628	1,464
Department of Education (Provincial).....	—	559	—	—
Other Governments or Administrations.....	294	—	59	—
Others.....	—	—	415	17
TOTAL.....	55,618	77,019	109,681	26,143
<i>Manufactures and Issues—</i>				
Autogenous Vaccines.....c.c.	184	—	28,350	247
Bacterial Vaccines (stock).....c.c.	—	—	262,741	} Included in Johannesburg figures.
Tuberculin Dilutions.....c.c.	—	—	—	
Sera (various).....c.c.	—	—	482,219	
Anti-rabic Vaccine.....c.c.	24,000	—	—	
Bulgarian Milk Cultures.....bottles	—	—	—	—
Insulin.....tubes	—	—	—	—
Chaulmoogra Oil Preparations.....c.c.	231,100	—	—	—
Smallpox Vaccine—Calf Lymph (prepared at Vaccine Institute, Rosebank)..tubes	1,187,144*	—	—	—
Attendances at Courts of Justice by Members of Staff.....	7	10	7	1
Total Days' Absence entailed by such attendances.....	7	10	33	8

* 1,519,600 tubes manufactured during year.

5. *Port Health Administration.*—The health work carried out at the Union Ports during the year is shown in a summary in Annexure "C" to this report.

Throughout the year the strictest measures were adopted for safeguarding the ports from the possibility of introduction of rodent plague from foreign countries. The most important of these measures is the careful examination of all ships arriving from plague-infected ports or ports serving plague-infected countries. The holds of such vessels are searched immediately after arrival before pratique is given, and again during discharge of cargo. Traps are set in the vessel during her stay in port and the sheds into which cargo is unloaded for several nights after arrival. Now that the Regulations under the International Sanitary Convention are in force very few ships are found on arrival to be rodent-infested. The regular lines of steamships trading to South Africa have, by eliminating the harbourages of rodents and other measures such as trapping, very successfully rid their ships of the pest. It is probable that the high cost of fumigation in foreign ports has made it sound business for these companies themselves to adopt anti-rodent measures to obviate the necessity for fumigation by harbour authorities. Careful anti-rodent measures are also adopted in all our harbour areas. Rodents are combated by building them out, trapping and poisoning. Rodents from ships and harbour areas are sent regularly to laboratories for bacteriological examination. In no cases was plague infection found.

Because of the satisfactory working of the international system of notification of disease on shipboard, the possibility of introduction of human infection of formidable epidemic disease such as smallpox has been reduced practically to zero. Thus the M.V. "Luxmi" which arrived at Durban on the 9th March, 1934, had reported the occurrence of a case of smallpox on board during the voyage from Calcutta. The patient was landed at Beira and the ship reached Durban before the incubation period of possible susceptible contacts had expired. As the boat was carrying a large number of Asiatics (including the crew for another vessel in Durban) she was kept at the inner anchorage in quarantine for the remaining days of the incubation period. No further cases occurred, however. This case would not have occurred had the Indian agents of the vessel taken the statutory precaution of ascertaining that the vaccination certificates of all on board conformed with the Union regulations. The British India Mail Steamer "Kenya" from Bombay, which arrived at Durban on the 9th May, 1934, had landed a case of smallpox at Seychelle Islands. As no further cases occurred, and the incubation period for smallpox had expired prior to arrival no precautionary measures were necessary.

A vigilant watch is kept on animal material which may contain anthrax infection. Samples of shaving brushes imported from Japan via Port Elizabeth were found to be infected with bacilli of this dangerous disease. Stern measures were necessary. Three consignments totalling 46 dozen brushes were destroyed by fire at the Government Horton Street Disinfectory, and the further importation of shaving brushes from Japan was prohibited.

The great prevalence of measles among the children on Japanese immigrant ships continues. These ships call at our ports twice a month bound for South America; each has approximately 1,000 immigrants on board, half of whom are children. The precautionary measures consisted in prohibiting children under 12 years of age from going ashore, and restricting persons allowed to go on board to officials and the necessary labour.

6. *Health Supervision of Aircraft.*—The 12th April, 1934, was the last date for signing the International Sanitary Convention for Aerial Navigation. At that date twenty-three countries, including the Union of South Africa had signed. The particular interest of the Union in this matter has been pointed out in previous reports. Owing to rapidity of transport, persons harbouring the infection of formidable epidemic diseases might enter the Union without obvious signs of illness due to the disease still being in the incubation stage. The disease more particularly to be feared is Yellow Fever, since the mosquito vectors of this infection abound in various parts of the Union. In addition to human patients there is danger of the introduction into the Union of infected mosquitoes. The necessity for hygienic co-operation between countries to and from which aircraft fly is, therefore, apparent.

Before final signature of the Sanitary Convention, its terms were very carefully discussed at various meetings by representatives of the countries chiefly concerned. It will be remembered that in November, 1932, the Secretariat of the League of Nations arranged a Conference in Capetown, to which the Governments of a large number of African Countries, the Government of British India, and the Rockefeller Foundation sent representatives. As the result of the discussions at this conference, various matters which were still outstanding between the States were adjusted and the signing of the Convention by the various Governments in Africa was recommended.

An Aerial Navigation Quarantine Commission has since been established. This is intended to be a standing commission, on which the Union of South Africa is represented, meeting at each session of the Office International

d'Hygiene Publique, to take stock of the position of the International Sanitary Convention for Aerial Navigation, and of technical questions arising from its application. It will maintain continuity in principles followed in the application of the Convention, by examining from a practical point of view questions, the solution of which might be important in connection with international communication by air.

With regard to the distribution of Yellow Fever infection, the Rockefeller Foundation instituted investigations in various African countries utilising the "Mouse-protection" test. By collecting specimens of blood from sample populations it was deemed possible by this test to ascertain whether Yellow Fever has existed in the area examined during the life-time of the population. Surprising information has emerged. According to the findings of this test, infection has occurred in comparatively recent times over much wider areas and much closer to our borders than was originally suspected. Thus in certain areas of the Belgian Congo and of the Anglo-Egyptian Sudan and in Western Uganda the test gave positive results although the presence of Yellow Fever, in a form clinically or biologically recognisable, had hitherto never been discovered. It must be remembered, however, that the members of African tribes often suffer from the disease in so mild a form as readily to escape notice. Such an infection, although mild in a Native, is as deadly as ever when conveyed to a European. As, however, Europeans have had access to the supposed infected areas without being known to have contracted the disease some doubt seems to have arisen recently as to whether the test can be regarded as absolutely specific. It is significant, however, that a case of Yellow Fever has since been diagnosed *post mortem* at Wau in the Province of Bahr-el-Ghazal in the Sudan. Wau is approximately 200 miles distant from the Juba aerodrome.

Investigations in the United States and elsewhere have demonstrated that the transport of mosquitoes, even in comparatively large numbers, by aircraft is of fairly frequent occurrence. Fortunately it is comparatively easy to destroy mosquitoes either before embarkation or after landing.

During the year a mosquito survey of Windhoek and Walfisch Bay, South West Africa was carried out by Dr. B. de Meillon of the South African Institute for Medical Research. As the result of this survey it is recommended that if any service from a Yellow Fever country is to connect up with South West Africa, Walvis Bay should be selected as the site for a Sanitary Aerodrome because of the absence of any mosquitoes. Dr. de Meillon found there also a relative scarcity of breeding places for any mosquitoes that might be introduced. Its isolation would render Walvis Bay easy to control in the event of mosquitoes or yellow fever patients being introduced.

7. *Health of Natives on the Mines.*—Supervision of health conditions on the mines was continued, the office in Johannesburg working in close association with that of the Director of Native Labour in all matters relating to native housing, feeding and hospital accommodation.

With the great expansion of the industry since the Union's departure from the gold standard, there has been a steady increase in the number of natives employed on the mines from roughly 220,000 in December, 1932, to approximately 250,000 in June of this year. This increase in the labour strength has necessitated extensive new construction of compounds as well as extension of existing compounds on the larger mines. The plans approved during the past year provide accommodation for over 20,000 natives.

Steady progress has also been made in the reconditioning of the older types of compound; the unsatisfactory continuous wooden bunks are gradually being eliminated and replaced by partitioned concrete bunks and various improvements are being effected in the kitchens, bathrooms, etc., as well as in general sanitation.

The question of the cramming of rooms with wooden bedboards and other articles liable to harbour vermin has again been taken up by the Director of Native Labour with the Chamber of Mines.

To meet present requirements hospital accommodation has been extended either by the erection of new hospitals or by additions to existing hospitals. Considerable improvements have also been made in the equipment of hospitals.

The Director of Native Labour and the Assistant Health Officer stationed in Johannesburg have been able to visit a number of the older compounds and the results of the interviews with the mine managements have been very satisfactory.

Health conditions have been good and the incidence of scurvy and other preventable diseases has been low.

There has been a big increase in the proportion of British South African labour from a normal figure of 100,000 in 1929 to 200,000 in June of this year. As yet no ill-effects are discernible from the much longer stay of those natives on the mines, viz., roughly 16 months as compared with about 12 months in previous years.

The introduction of "tropical" labour from British Bechuanaland and Southern Rhodesia, was inaugurated in January last. The physique of the natives sent forward up to the present has been very good, their average weights being well above the average weight of natives employed on the mines. While too early to form an opinion as to their suitability for mine work from a health point of view, the experience up to the present has been very satisfactory and augurs well for the future. The importation of "tropical" natives was limited to 2,000.

Heat Stroke.—During the year under review there were 17 deaths from this cause among natives as compared with 20 during the previous year and 21 and 27 respectively during the two preceding years. The total number of "heat stroke" accidents was 43, of these 13 occurred on 3 mines in the Johannesburg Mining Inspectorate; 21 on three mines in the Germiston Inspectorate; 6 on two mines in the Brakpan Inspectorate and 3 on one mine in the Krugersdorp Inspectorate. According to the last Annual Report of the Government Mining Engineer "the death-rate from heat stroke is .09 per 1,000 per annum for 1933, compared with .08 for 1932 and .08 for 1931. The increase in the deaths under this heading is accounted for by fatalities on mines where heat stroke was previously unknown. The acclimatisation of natives is receiving more attention and it is satisfactory to record that the erection of stations for testing natives and rejecting those unduly susceptible to heat stroke is gradually being extended.

The Coal Mines of the Eastern Transvaal and the Witbank area were inspected by the Director of Native Labour and the Assistant Health Officer. While conditions were found on the whole to be fairly satisfactory, representations were made to the mine managements for the improvement of existing compounds, for the provision of additional accommodation and for the improvement of conditions generally. It is gratifying to be able to record that most of these recommendations are being given effect to.

V.—INFECTIOUS AND PREVENTABLE DISEASES.

1. *Notifications.*—The following table shows the notifications of infectious diseases by medical practitioners during the year, the totals for the previous year being inserted for comparison. It must be borne in mind that many cases of such diseases, particularly in natives, are never seen by a medical man, and consequently are not notified:—

TABLE E.—NOTIFICATION OF DISEASES BY MEDICAL PRACTITIONERS DURING THE YEARS ENDED 30TH JUNE, 1933 AND 30TH JUNE, 1934.

Disease.	Year Ended 30th June, 1933.		Year Ended 30th June, 1934.										
	Union.		Cape Province, excluding Transkei.		Transkei.		Natal.		Orange Free State.		Transvaal.		
	Union.	Total.	European.	Non-European.	European.	Non-European.	European.	Non-European.	European.	Non-European.	European.	Non-European.	
Anthrax.....	61	61	9	18	—	4	—	—	5	3	6	5	11
Diphtheria.....	1,205	1,780	547	321	9	12	235	62	453	68	29	44	44
Enteric or Typhoid Fever.....	4,389	8,267	806	1,126	24	733	194	457	506	4	2	1,020	2,441
Erysipelas.....	372	398	88	51	1	2	21	2	144	18	5	66	66
Glanders.....	—	—	—	—	—	—	—	—	—	—	—	—	—
Leprosy.....	117	105	—	18	—	15	—	16	—	2	5	2	47
Malta Fever.....	6	—	—	—	—	—	—	—	—	—	—	—	—
Meningitis, Epidemic Cerebro-spinal.....	308	286	37	111	—	4	2	13	24	2	7	24	86
Ophthalmia, Gonorrhoeal.....	68	50	6	29	—	1	2	2	2	4	3	2	1
Ophthalmia Noenatorum.....	381	351	39	213	—	2	1	3	31	16	23	31	23
Plague (for detailed list of cases and deaths, see Table H).....	8	39	—	16	—	—	—	—	—	2	20	—	1
Polio-myelitis, Acute.....	46	64	13	16	—	—	—	—	12	12	5	15	3
Puerperal Fever, including Puerperal Sepsis..	373	355	50	103	1	7	13	16	89	5	13	89	58
Rabies.....	1	3	—	—	—	—	—	—	—	—	—	3	—
Scarlatina or Scarlet Fever.....	1,064	1,283	259	23	5	1	131	5	764	82	1	12	12
Smallpox (for detailed list of cases and deaths, see Table J).....	15	29	5	6	—	—	—	1	—	—	8	—	9
Trachoma.....	36	30	10	—	2	6	1	3	—	—	—	1	7
Tuberculosis.....	6,911	7,693	466	3,554	—	1,047	125	837	22	22	201	150	1,291
Typhus Fever (for detailed list of cases and deaths, see Table L).....	1,231	3,158	34	696	2	658	11	61	15	15	1,592	2	87
Lead Poisoning.....	6	3	—	2	—	—	—	—	—	—	—	1	—
TOTALS.....	16,624	23,971	2,373	6,305	44	2,492	736	1,483	761	2,880	2,710	4,187	4,187

2. *Bilharziasis or Human Schistosomiasis*.—Bilharziasis has long been known to be very prevalent in certain parts of the Union. In the Departmental Reports for 1925 and 1926 short articles on its prevalence and causation in the Union were published; these caused wide-spread interest. Numerous letters were received from many parts of the Union requesting further information. In consequence a pamphlet, viz., No. 339 (Health) was published dealing more fully with the distribution, causation, symptoms, prevention and treatment of the disease. Copies of this pamphlet were supplied to the Provincial Administrations, Local Authorities, Educational Authorities, Magistrates and others interested. It included a folding poster giving life size illustrations of the snails which act as vectors of the infection, their natural enemies, the method of human infection, and the area of the Union involved.

Prior to 1916 no method of cure or successful treatment of this disease was known. In that year, however, Christopherson demonstrated in Egypt that intravenous injection of tartar emetic (antimony potassium tartrate) solution would cure the disease. At first this important discovery was applied mainly by interested medical men in Natal and Transvaal.

The earliest attempt to carry out mass treatment of infected school children in the Union was at Zeerust, Transvaal, where in 1926 Dr. F. Z. van der Merwe, School Medical Officer and Dr. S. Moll, the local District Surgeon treated a considerable number of infected pupils with great success during the school vacation. During the Christmas vacation of 1927 a very successful Bilharzia camp was organised by Dr. Elizabeth Theron, a School Medical Officer for the Transvaal; she personally gave the necessary intravenous injections of tartar emetic solution with very excellent results, while Mr. Linney, an energetic inspector of schools supervised the camp. As a result of the success of these early efforts at mass treatment this Department, in co-operation with the Transvaal Education Department and the South African Red Cross Society, called a conference to discuss active measures and propaganda work. It was arranged that the Public Health Department and Transvaal Education Department should each make an annual monetary grant, while the Red Cross Society would co-operate by supplying the necessary drugs and the services of voluntary nurses and senior medical students at camps.

The School Medical Officers of the Transvaal Education Department undertook to arrange to hold Bilharzia camps during most of the long school vacations for the purpose of treating the disease in large numbers of sufferers among school children.

Since 1928, 13 of these camps have been held in the following localities in the Transvaal:—

- (1) Nylstroom—January, 1928.
- (2) Nelspruit and White River—July, 1929.
- (3) Ohrigstad—July, 1929.
- (4) Groot Marico—January, 1930.
- (5) Piet Retief—January, 1930.
- (6) Nelspruit (2)—July, 1930.
- (7) Louis Trichardt—January, 1931.
- (8) Zeerust—July, 1931.
- (9) Sanddrift—July, 1931.
- (10) Alma—January, 1932.
- (11) Brits—December, 1933.
- (12) Potgietersrust—January, 1934.
- (13) Zeerust (3)—January, 1934.

During the earlier camps the children were treated only with Sodium Antimony Tartrate. The total number of children treated by intravenous injections of this drug was 351. Since July, 1930, Fonadin has been chiefly used, a total of 209 patients having been treated by means of intra-muscular doses of this drug. The following table shows the result of treatment at the various camps.

SCHOOL BILHARZIA CAMPS.

Locality of Camp.	Date.	Number treated with Antimony.	Number cured with Antimony.	Number treated with Fouadin.	Number cured with Fouadin.
1. Nylstroom.....	January, 1928	53	53	—	—
2. Nelspruit and White River..	July, 1929	74	54	—	—
3. Ohrigstad.....	July, 1929	43	28	—	—
4. Groot Marico.....	January, 1930	74	71	—	—
5. Piet Retief.....	January, 1930	52	50	—	—
6. Nelspruit (2).....	July, 1930	—	—	50	30
7. Louis Trichardt.....	January, 1931	—	—	48	46
8. Zeerust (2).....	January, 1931	29	25	10	9
9. Zanddrift.....	July, 1931	26	23	43	40
10. Alma.....	January, 1932	—	—	58	51
11. Brits.....	Sep.-Dec. 1933	—	—	131	129
12. Potgietersrust.....	January, 1934	—	—	23	19
13. Zeerust (3).....	January, 1934	—	—	25	25
	TOTAL.....	351	304	388	349

By "cured" is meant that at the end of the Camp the child's urine was found to be free of blood and ova.

The camps carried out simultaneously at Nelspruit and White River may be taken as typical of the various camps. They were held during the Winter vacation—July, 1929. Prior to the camps intensive propaganda was carried out by the School Medical Officers, who held public meetings to educate both the parents of sufferers and all other interested members of the local public. The audiences were informed that all school children who suffered from bilharziasis would have an opportunity of being carefully examined and treated so as to become cured in a way that had very rarely been found possible previously in South Africa. In addition to the actual treatment the parents and patients alike would, while the camps were on, be given lectures and magic lantern exhibitions, so as to give them all necessary information in regard to this common disease, its treatment and cure. The local public was invited to co-operate by providing boarding for children whose homes were at a distance, meals, especially fruit, transport facilities, and organised sport. The public of Nelspruit showed great interest and sympathy, supplying vegetables and fruit and assisting in other ways. When the camps commenced 40 children were enrolled for treatment at Nelspruit and 34 at White River, a total of 74. Each child was carefully examined medically to ensure fitness for the treatment, and also as to whether examination of the urine showed the presence of bilharzia ova as well as blood corpuscles. Injections were given every other day. Each morning one-half of the children attended roll-call, were injected intravenously with Sodium Antimony Tartrate solution, commencing with $\frac{1}{4}$ to $\frac{1}{2}$ grain doses dissolved in 10 c.c. normal saline solution gradually increasing until the maximum dose was reached, viz., 2 grains in 10 c.c. At the close of the camp 43 of the 74 cases were cured, i.e. their urine was free of blood and ova. Of these 43 children 30 required less than the maximum dose. 31 others had at the close of the camp not yet been cured by administrations of the maximum total dose, but arrangements were made with a local doctor to carry out full treatment in these cases, so as to ensure their cure.

No serious complications occurred, and the unpleasant symptoms associated with the drug, such as nausea, vomiting, coughing and conjunctivitis were all of a mild character. The children were carefully supervised for at least an hour after each injection to obviate any serious complication. During the injection times many parents and others who were interested visited the camp in order to obtain information and to satisfy their natural curiosity. It can truthfully be said that the interest and enthusiasm of the public was aroused, particularly when it became evident towards the end of the period of treatment that not only were most of the children actually cured of the disease, but that they showed obvious signs of being immensely improved physically. Their improvement in health was obvious to all.

By way of propaganda the Medical Officer and his staff at the camp gave full information whenever any interested person asked for it. Besides these personal interviews, many pamphlets dealing with the subject of Bilharzia were distributed. Towards the end of the camp a public lecture on the disease was given by an Assistant Health Officer of the Department, who also demonstrated the Department's interesting Bilharzia film. There was a very big audience; microscopes showing the living ova as well as living snails obtained from the local stream were demonstrated to those present.

The staff engaged at these two camps consisted of a medical officer from the Transvaal Education Department, one school nurse, two medical students, and two V.A.D.'s. Several of the local school teachers ably assisted this professional staff by undertaking secretarial work and making themselves useful in supervising the children in every way necessary.

Since July, 1930, when a second camp was held at Nelspruit, Fouadin has been the drug chiefly used for the purpose of mass treatment. The early results with this drug were not as good as those obtained with antimony, but after re-examination and further Fouadin treatment very successful results were obtained. The results obtained with Fouadin at Louis Trichardt six months later, as well as at later camps, were very good. Reports obtained from Dr. Kieser, the Senior School Medical Officer, regarding the two drugs may be summarized as follows:—

- (1) Fouadin does not provide a short-cut to cure; it is usually slower in curing the patient than Antimony Tartrate.
- (2) The percentage of cures effected in mass treatment is approximately equal for the two drugs.
- (3) Unless Fouadin is very carefully injected by the intramuscular method, and then only at intervals of two days, there is considerable danger of damage to the liver resulting from cumulative action of the drug.
- (4) Antimony Tartrate is undoubtedly much the cheaper drug and it is quicker in its action, but it is apt to cause more severe symptoms than Fouadin.
- (5) Antimony Tartrate is easily injected intravenously in the case of older children and adults and gives little trouble. But in the case of small children with small veins Fouadin is preferred, both by the medical man and the patient.
- (6) Fouadin when given in large doses or at frequent intervals, and especially when given intravenously, causes enlargement and painfulness of the liver accompanied by rise of temperature. When using Fouadin the possibility of liver lesions should always be taken into consideration and avoided by proper injections.

The School Medical Officers were able to follow up the cases treated in the camps by circularising the principals of a number of the schools from whom the patients had been drawn as to the degree of physical and mental improvement shown in the months following the treatment. In the large majority of cases the children were said to show marked and probably permanent physical improvement. In the majority also mental progress at school was reported of the children who had been treated and cured at the camps. In a considerable number of cases where little or no improvement was noted, this was ascribed to the fact that the children had suffered not only from bilharzia, which was treated and cured, but also from malaria which had not been treated to any extent. In other cases which at the end of the month's treatment had shown marked physical improvement with absence of ova or blood corpuscles, yet at the end of three months showed renewed signs of bilharzia the children admitted that they had, subsequent to their cure at the camp, become re-infected as the result of swimming or wading in infected water. The school medical officers estimated that the percentage of bilharzia patients cured by means of Antimony Tartrate injections was approximately 85 per cent., and by means of Fouadin injections 80 per cent. These figures include cases which were not known to be definitely cured at the re-examination as indicated by total absence of ova and blood corpuscles, but only probably cured, experience having proved that cases which on discharge from treatment still showed a few redblood cells in the sediment, but no ova would in the course of a month or two become absolutely negative provided, of course, that there was no re-infection.

Since 1932 only a few camps have been held. The Transvaal Bilharzia Committee has, however, been encouraging the construction of swimming baths at certain villages and farm schools by means of grants in order to lessen the danger of re-infection. The danger of re-infection, after children had been cured, was specially noted at the Alma Camp. The schools at Louis Trichardt and Doornfontein (Alma) have been assisted by means of advice as to the best method of building swimming baths and by the erection of a wind-mill operated borehole, the Bilharzia Committee paying half the cost. Subsequently at two other schools, namely, those at Ohrigstad and Groot Marico, similar assistance has been sought, but on account of scarcity of pure water the assistance could not be granted.

Enquiries were made in 1930 by the Natal Education Department about the methods adopted in bilharzia camps as carried out in the Transvaal,

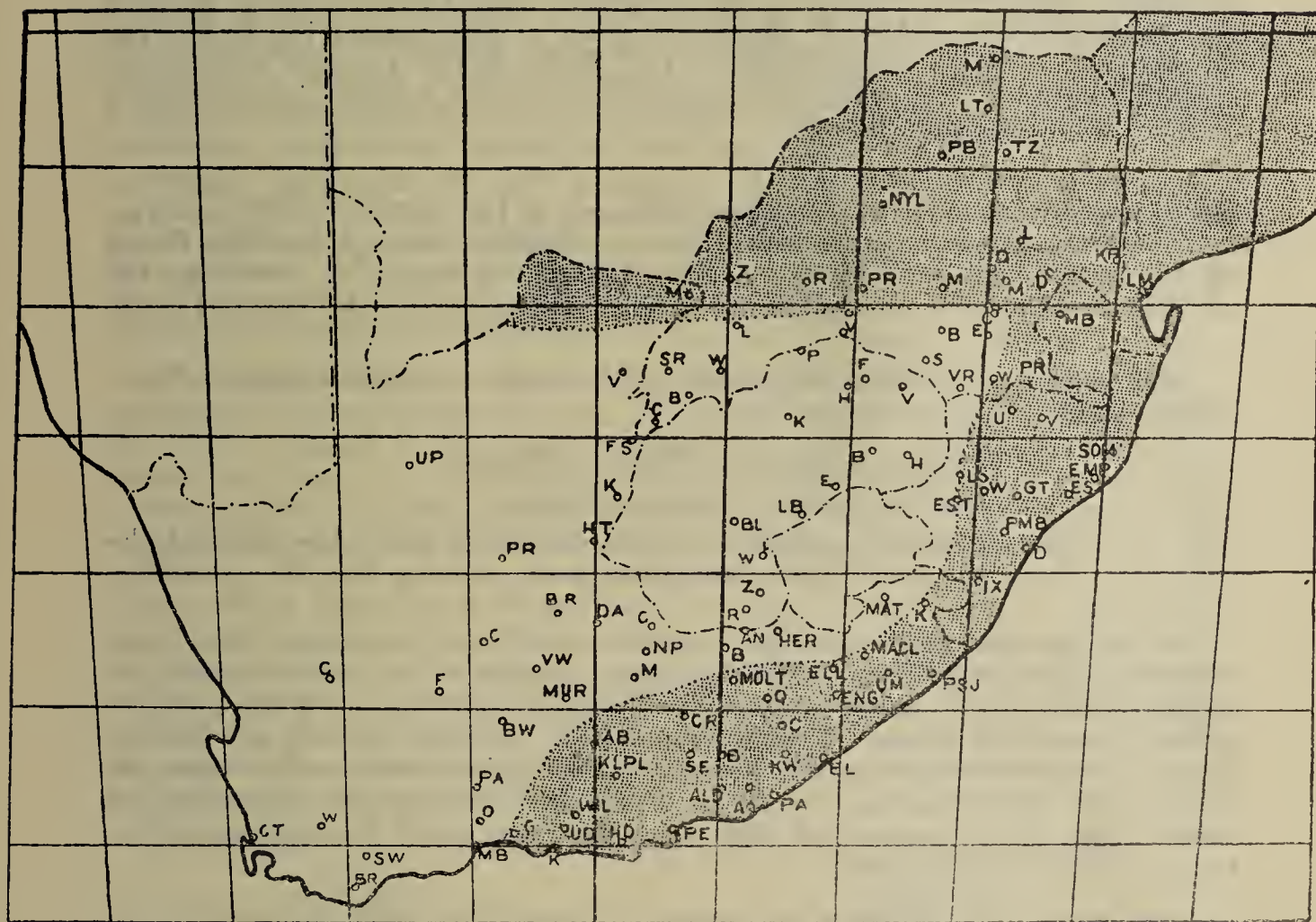
Full information was provided, but it is to be recorded with regret that the Province decided not to follow the example of the Transvaal Provincial Administration.

In October, 1929, the Bilharzia film for public use by the Department was drawn up. The original film had been made by the staff of the South African Institute for Medical Research. It was generously donated to this Department which made certain changes and improvements. The film has been frequently used in connection with the camps and has been found of very great value as propaganda. It has also proved of educative value in teaching the general public how to prevent bilharzia infection.

In 1932, £75 were spent on metal plates warning the public against bilharzia and against swimming in various pools known to be infected. These metal plates are put up by local authorities, school teachers and others interested, at places known to be infested and have been found of considerable value.

Distribution.—The Department is frequently approached by persons wishing to be informed as to whether a particular place is safe from bilharzia infection. Unfortunately it has not yet been found possible to make a detailed survey of many of the affected areas. The shaded area in the accompanying map indicates in a general way the area of the Union in

MAP I.—DISTRIBUTION OF BILHARZIA INFECTION IN THE UNION.



which the streams and other natural collections of water are known or liable to have infected snails. The degree of infestation varies very greatly in this area depending on the natural suitability of the water in any locality for fresh water snails and the local measures that have been adopted for combating snails. Where the banks are steep and free of vegetation snails cannot live. Local abundance of their natural enemies such as duck and trout may also cause their complete disappearance.

According to our present knowledge all slow-flowing streams and stagnant pools with muddy bottoms and vegetation covered sides in the shaded area of the map must be treated with suspicion. In the Cape Province the area includes the southern and eastern belt commencing from Knysna in the south; this belt varies in width from 50 to 100 miles, depending on the altitude above sea-level. Practically the whole of Natal and Zululand is seen to be included—excepting only regions with an altitude over 4,500 feet. In the Transvaal the area includes the whole of the lowveld and the region north of a line drawn from Delagoa Bay to Lichtenburg and beyond, excepting regions over 5,000 feet in altitude. The Orange Free State and Basutoland are free of infection as far as known. The whole of Portuguese East Africa and the southern and eastern portions of Southern Rhodesia are stated to be infested.

For certain areas somewhat more definite information is available. Thus School Medical Officers of the Transvaal report that in the districts

of Brits, Krugersdorp, Potchefstroom, Pretoria, Rustenburg and Zeerust the percentage of infection among European school children varies from 5 to 30 per cent., whereas at Johannesburg and the vicinity of the Vaal River throughout its length the percentage is nil.

Attempts have been made to follow the distribution of infection upstream along rivers. In the Aapias River at Pretoria the highest point to which infection has been traced is a few miles below the Waterkloof dam. Lower down along its course infected snails have been found in the Innesdale Valley, at Bon Accord Dam and at the point where it joins Pienaars River. From there to the points where the latter stream joins the Sand and Crocodile Rivers much infection among snails has been found. Infection has been found in the Crocodile River below the Hartebeestpoort Dam and at the Junctions with it of Six Mile Spruit (Hennops River), Jukskei, Blaauwbank and Magalies Rivers. Regarding the Hartebeestpoort Dam no infected snails have been recovered from the dam, but they have been found at Pelindaba above the dam, and also plentifully in the Crocodile Valley immediately below the dam. From the Dam itself Dr. Annie Porter in 1928 examined some 1,600 live snails, but none of them were found to be infected.

Last November Dr. Kieser investigated the school at Fountainebleau on the Jukskei River; of 115 children 30 were found to be infected. This infection was attributed to the Klein Jukskei River, wells and springs in the neighbourhood and farm dams.

Regarding the Cape Province, the Knysna, Keurbooms, Coega and Swartkops Rivers are known to be infected. The Baakens River at Port Elizabeth is heavily infected. Boys are known to have become infected in the Sundays River near Graaff-Reinet. Dr. Bligh Wall, District Surgeon of Kingwilliamstown, has treated numerous cases that became infected from bathing in the Buffalo River.

From this description it will be realised that our knowledge regarding the degree of risk of infection in various parts of the country is still meagre, and it is hoped that it may be possible at no distant date to induce the Board of the South African Institute for Medical Research to continue the admirable field and laboratory work so ably conducted by Dr. Annie Porter.

Prevention of Urinary Bilharziasis.—Preventive measures resolve themselves in order of importance into—

- (i) Measures against the human sufferers;
- (ii) Measures against the snail vectors;
- (iii) Measures against the *cercariae* which leave the body of the snail and enter the human body.

(i) *Measures against Human Sufferers.*—These are much the most important since an infected individual may continue to excrete bilharzia ova for many years, whereas an infected snail usually only live for a few months, seldom more than a year. If it were possible, therefore, to cure all persons in the Union suffering from the disease, or alternatively effectively to prevent them from contaminating by their urine, any streams or collections of water, then within a period of little more than a year all danger from infection will have disappeared.

An attack on bilharzia by means of mass treatment throughout the affected area of the Union is, therefore, urgently to be desired. A small start has already been made by means of the school camps already referred to. The first step in such a campaign would be a careful survey of the distribution of infection among the population of the Union; thereafter state and local authority action on a very intensive scale throughout the affected area could be arranged.

Meanwhile every precaution should be taken against sufferers micturating in or near streams and other collections of water. Unfortunately for our campaign against bilharziasis Europeans as well as non-Europeans seek some degree of privacy when voiding excrement. In rural areas the bush and other growth in the immediate neighbourhood of water readily provides this privacy. The same factor operates in the case of typhoid; rural carriers are a great source of danger to water supplies.

(ii) *Measures against Snails.*—It is unlikely that an effective, general, mass treatment campaign against sufferers will take place in the immediate future. The provision of latrines all over the countryside to furnish the privacy desired by human beings will follow also only on a long process of education of public opinion. It is necessary, therefore, in the meantime to direct our attention against the snail vectors. Here again the first step, if our measures are to be effective, is a careful survey of the affected areas. It is necessary to know in what collections of water infection among snails already exists, or is likely to occur as the result of infection among the surrounding human population

After such a survey has been made it will be possible to protect the public by—

- (a) putting up notices near all dangerous pools or streams warning persons against the danger of bathing, paddling or washing in such water;
- (b) providing swimming baths protected against access of snails in the affected areas. Any cercariae that may have entered during the filling of the bath will all have died if for two days after filling bathers are excluded. Such baths are a great necessity in the parts where bilharziasis occurs, to meet the strong urge, particularly of small boys, to go swimming during the hot weather. Water in such baths can quickly be rendered safe by treatment with copper sulphate which, in the proportion of 1 lb. to a 100,000 gallons of water, destroys all cercariae and any snails that may have entered;
- (c) by clearing suspected streams and pools of all vegetation so as to starve out the snails;
- (d) by encouraging and protecting duck and other waterfowl which eat snails;
- (e) by stocking our streams with trout and other fish which feed on snails.

(iii) *Measures against cercariae.*—These consist of destroying cercariae in bathing pools by storage of the water for 48 hours, or introduction of copper sulphate. Domestic water supplies should be protected by means of filtration or storage. Mere chlorination does not destroy the cercariae. Another useful measure is the introduction into pools and streams of such freshwater, surface-feeding fish as “millions” or “kurpers”.

3. *Enteric or Typhoid Fever.*—The continued prevalence of typhoid fever in our midst is a grave reflection on the degree of civilisation to which we have attained. It is a preventable disease, and the preventive measures consist essentially in the cleanliness of living which are taken for granted in communities which have attained to a reasonable degree of culture.

Typhoid fever occurs only as the result of contamination with human excrement of the food or drink we consume. When entirely cleanly habits have been adopted by the whole community, when human excrement is so disposed of that it can neither contaminate water supplies nor be conveyed to food by flies, and when refuse generally is so dealt with as to prevent the breeding in it of flies who will always search out the weaknesses in our excrement disposal systems, then and then only will we be freed from this disease which annually takes so heavy a toll of human life in the Union. No class is immune. In our cleanest households flies may have contaminated the food previous to its arrival, or it may have been handled by human carriers of typhoid infection whose habits are unclean. We have to do here then with a general education of the community in cleaner methods of living and a general improvement throughout the Union of supervision by local authorities of sanitary services.

The notifications of typhoid during recent years were as follows:—

1926-27	...	...	...	...	...	...	...	...	4,018	cases.
1927-28	...	...	...	...	...	...	...	...	5,787	„
1928-29	...	...	...	...	...	...	...	...	4,963	„
1929-30	...	...	...	...	...	...	...	...	3,775	„
1930-31	...	...	...	...	...	...	...	...	4,793	„
1931-32	...	...	...	...	...	...	...	...	4,505	„
1932-33	...	...	...	...	...	...	...	...	4,389	„
1933-34	...	...	...	...	...	...	...	...	8,267	„

As has been pointed out in previous reports the actual incidence of the disease must be vastly greater than these figures indicate. (Since it punishes gross uncleanness it is most prevalent among the lowest strata of our society, namely the least civilized of the Bantus. Among them notification of disease and death is extremely faulty. Among the Bantu too the causative bacillus not infrequently produces a condition which is not recognisable as typhoid apart from special laboratory tests. The classical picture is, more often than not absent. Many, if not most cases of typhoid, are likely to be missed in Native communities where modern laboratory facilities are entirely absent.)

But even if we consider only the notified cases the position is bad enough, and as the above table indicates it was particularly bad during the year under review. While some of the increase must be attributed to the floods much of it must be looked upon as the culmination of the long period of depression in which the lowest orders suffered most. Increasing poverty is almost unavoidably accompanied by a deterioration in personal habits. A loss of self-respect is quickly followed by neglect of cleanliness of person.

It is not surprising, therefore, that the rural communities suffered very heavily. But our larger towns did not by any means come off unscathed. The Reef towns outside Johannesburg suffered heavily. During the months October to May during which the disease usually spreads rapidly in unhygienic surroundings 515 cases were reported from Boksburg; 283 from Benoni; 356 from Springs; 243 from Brakpan and 152 from Germiston. The state of affairs indicated by these large figures in towns of such importance is deplorable. The deduction that their health services are unsatisfactory is almost unavoidable. On enquiring into the matter the astonishing fact will be learnt that none of the towns mentioned employ even one Medical Officer specially trained in the prevention of disease who devotes the whole of his time to public health matters. The urgent need in many of our towns for the employment of qualified medical officers of health is referred to elsewhere in this report. Here it will suffice to draw attention to one obvious result of an imperfect health service in a thickly populated community.

As in previous reports a table has been prepared showing the incidence of typhoid in certain local authority areas during the year. Since the degree of prevalence must be looked upon as a criticism of the general cleanliness and sanitary efficiency of the area it is hoped that this "black list" will have a salutary effect on those communities which appear high up on it.

TABLE F.—ENTERIC OR TYPHOID FEVER—NOTIFICATIONS AND INCIDENCE IN CERTAIN LOCAL AUTHORITY AREAS DURING THE YEAR ENDED 30TH JUNE, 1934 (ARRANGED IN ORDER OF INCIDENCE RATE)—EXCLUDING CASES RETURNED AS “IMPORTED”.

Place.	Notifications.			Incidence per 1,000 of Population.		
	European.	Non-European.	Total.	European.	Non-European.	All Races.
Zastron.....M.	70	34	104	36.29	33.43	35.30
Ladybrand.....M.	47	48	95	19.62	29.74	23.69
Alice.....M.	—	56	56	—	33.37	23.53
Aliwal North.....M.	18	135	153	6.72	35.04	23.43
Rouxville.....M.	28	8	36	31.57	12.31	23.42
Nigel.....M.	2	82	84	1.44	37.10	23.33
Molteno.....M.	18	34	52	14.10	28.12	20.92
Umtata.....M.	9	62	71	3.91	33.35	17.06
Springs.....M.	25	360	385	3.26	24.14	17.05
McGregor.....M.	4	11	15	12.62	17.94	16.13
Burghersdorp.....M.	18	39	57	9.00	22.50	15.27
Kestell.....M.	4	13	17	5.99	25.44	14.42
Clocolan.....M.	3	26	29	2.52	31.25	14.34
Boksburg.....M.	126	424	550	9.01	16.59	13.91
Steynsburg.....M.	15	12	27	11.85	14.89	13.03
Petrusville.....M.	4	8	12	7.14	21.39	12.85
Vrede.....M.	32	9	41	20.13	5.44	12.64
Dewetsdorp.....M.	5	16	21	5.01	21.86	12.13
Wepener.....M.	5	20	25	4.01	23.28	11.87
Steynsrust.....M.	11	—	11	16.06	—	11.03
Colesberg.....M.	18	8	26	17.16	5.12	9.95
Matatiele.....M.	4	15	19	4.20	14.56	9.58
Brakpan.....M.	79	186	265	7.03	10.59	9.21
Ficksburg.....M.	20	14	34	8.06	10.54	8.93
Brandfort.....M.	3	19	22	2.17	17.16	8.84
Cala.....M.	1	10	11	1.36	14.93	7.82
Graaff-Reinet.....M.	8	61	69	1.80	12.81	7.49
Hopetown.....M.	7	4	11	8.33	5.93	7.27
Heilbron.....M.	5	15	20	3.45	9.76	6.70
Hereules.....M.	24	15	39	5.36	9.29	6.40
Sterkstroom.....M.	10	3	13	9.28	2.88	6.13
Heidelberg (Transvaal).....M.	5	15	20	2.58	11.33	6.13
Benoni.....M.	29	286	315	1.65	8.37	6.09
Bethulie.....M.	8	9	17	5.03	7.46	6.08
Senekal.....M.	4	13	17	2.35	10.46	5.77
Calvinia.....M.	12	1	13	11.04	0.77	5.46
Germiston.....M.	26	158	184	1.33	9.48	5.08
Standerton.....M.	5	16	21	2.18	8.43	5.01
Bloemfontein.....M.	77	139	216	3.28	5.99	4.63
Frankfontein.....M.	6	6	12	4.14	4.59	4.35
Queenstown.....M.	25	35	60	3.78	4.58	4.21
Dundee.....M.	6	8	14	3.59	3.63	3.62
Klerksdorp.....M.	15	4	19	4.17	1.56	3.08
Newcastle.....M.	3	9	12	1.74	4.09	3.06
Krugersdorp.....M.	12	60	72	0.88	5.51	2.93
Vereeniging.....M.	7	10	17	2.06	2.79	2.43
Pretoria.....M.	125	75	200	2.23	2.82	2.42
Paarl.....M.	18	16	34	2.31	2.41	2.35
Randfontein.....M.	4	41	45	1.21	2.28	2.11
Kroonstad.....M.	7	19	26	1.35	2.11	1.83
Ladysmith.....M.	8	5	13	2.19	1.40	1.80
Cradock.....M.	6	6	12	1.66	1.70	1.68
Roodepoort.....M.	4	36	40	0.49	2.12	1.59
Johannesburg.....M.	229	250	479	1.15	1.72	1.39
Port Elizabeth.....M.	49	44	93	1.20	1.54	1.34
Potchefstroom.....M.	11	9	20	1.11	1.74	1.33
Uitenhage.....M.	13	5	18	1.39	0.78	1.14
Durban.....M.	67	119	186	0.83	1.36	1.11
Pietermaritzburg.....M.	9	16	25	0.43	0.91	0.65
Capetown.....M.	80	72	152	0.58	0.63	0.60
Kimberley.....B.H.	15	7	22	0.85	0.33	0.57

M. = Municipality.

B. of H. = Board of Health.

All European rates calculated on population as at Census 1931.

Non-European rates calculated on population as at Census 1921, except Capetown, Port Elizabeth, East London, and Bloemfontein, which are calculated on population as at Census 1926.

Typhoid Carriers.—The recognised sufferer from enteric fever is not the only or even the chief source of infection. Once the disease is diagnosed it is a comparatively easy matter to isolate the patient and dispose safely of his infective excrement. Of greater danger are the numerous cases which, as indicated above, are never diagnosed. No steps are generally taken to render harmless their highly dangerous excrement. But the biggest problem in combating the spread of infection from individuals harbouring typhoid bacilli are the apparently healthy typhoid carriers. These are persons who at some previous occasion have suffered from the disease from which they apparently completely recovered, but in whom the typhoid bacilli continue to live although giving rise to no very obvious sign of their presence. It has been estimated that some 4 per cent. of all persons who contract typhoid

subsequently become permanent carriers of infection, continually excreting the bacilli in their faeces or urine. Bearing in mind how prevalent typhoid has been in the Union in the past it is clear that there must be a very large number of these human reservoirs of infection moving unrestrained among us. In fact, the assumption that has been made that at least 50 per cent. of the adult Bantu population of the Union have suffered from typhoid at some time in their lives is probably an underestimate. We are, therefore, faced by a possibility that at least 2 per cent. of the adult natives are typhoid carriers. There is, therefore, a constant supply of typhoid infection in all communities of South Africa. It is this fact that makes the greatest degree of cleanliness with regard to the disposal of all human excrement so important.

Owing to the very large number of undetected carriers in our midst it is virtually impossible to deal with the carrier problem direct. There is the initial difficulty of diagnosing the carrier state. This can only be done by a series of bacteriological examinations of the excrement of the suspected subject, or possibly by a blood examination. Heretofore this has only been attempted, and then only by a few municipalities, in the case of native employees who handle food, particularly those engaged in the dairy trade.

But even after a carrier has been detected there is the difficulty of his disposal. Merely to repatriate a carrier to the Native territories as was done until recently by certain Transvaal Municipalities is of little use. It merely serves to spread the disease in the country side. Moreover once back in the reserves there is nothing to prevent the native returning to the same or another town, and obtaining a new pass. What is more likely than that he should seek work in the same trade in which he had previously earned his living? Indeed in this way it has been shown that the same native has been responsible for a number of milk borne typhoid outbreaks in the same town during a very short period of years.

Curing of the typhoid state by means of treatment has been suggested. It has been mentioned above that the typhoid carrier shows no obvious symptoms of disease. It has been clearly established, however, that he is not normally healthy. If his condition is not treated he may later suffer from severe ill-health such as gall-stones or even cancer. This being the case it is in the interests of the carrier as well as that of the general public that his condition be treated. The commonest site for the typhoid bacilli to find harbourage after the patient has recovered from the acute illness is the gall-bladder. Where this is the only focus the carrier condition can be completely cleared up by operative removal of the gall-bladder, to the great general improvement in health of the subject. It is also possible by other excisions elsewhere in the body to cure the condition. While a number of individuals could be thus cured of their carrier state by operation, it is obviously impracticable to apply this measure to the great horde of native carriers.

The dispelling of the carrier condition by means of certain forms of vaccination is claimed by some investigators to be possible, although strongly repudiated by others. This method, because of the obvious ease with which it could be carried out, requires to be investigated further.

A method of dealing with discovered carriers who are not prepared to submit to operative treatment would be segregation in labour colonies, but this has not been considered practicable in any country in the world. Typhoid carriers are a greater menace to the health of the community than leprosy. Yet large sums of money are spent annually on segregation and treatment of lepers.

It is really only the occupations involving the handling of food substances that need special attention in this connection. If the trades concerned could be protected from the employment of carriers the main problem would be solved. To do this it would be necessary to examine all employees prior to engagement and at regular intervals so that all carriers could be rigidly excluded. It is the dairy trade which has been responsible for most of the typhoid infection known to be derived from carriers. This trade should, therefore, be guarded in the manner indicated. The position could be further controlled if a record could be kept of carriers detected in dairy employ. Owing to the fact that most of the persons concerned are natives, adequate supervision apart from compulsory segregation as above suggested is virtually impossible. The pass system is useless for this purpose. It has, therefore, been suggested that fingerprints be taken of all natives who are found to be typhoid carriers, and also of all natives prior to engagement for dairy work. Before natives are registered for such employment their fingerprints would be checked against those recorded in the carrier register, and it could readily be ascertained whether they had previously been discharged from dairy employment because of the carrier state. This suggestion was referred to the Commissioner of Police who expressed the opinion that no practical benefit would result from the keeping of a record of fingerprints of enteric carriers by the South African Criminal Bureau unless there were legal provision for segregating such carriers as is done in the case of lepers.

The matter has received the urgent consideration of a number of Transvaal local authorities and also of the Director of Native Labour. The South African Medical Congress held at Capetown in September, 1933, passed a resolution "that the notice of the Union Health Department be directed to the necessity for the control of the typhoid carrier, and that further action be taken in this direction by making it obligatory for the local authorities to notify and furnish full particulars of any such carriers discovered within their area".

The subject was discussed by the Council of Public Health at its meeting in January, 1934, and it was agreed that the problem was one of the greatest difficulty and almost insoluble. The Council recommended that a central register of carriers be opened by the Department; that local authorities should be urged not to repatriate native carriers to the territories, but rather to find them safe local employment; and that the passes of all natives known to be typhoid carriers should be endorsed with the words "Not to be employed in handling foodstuffs". Arrangements are being made to act on these recommendations.

In any case the problem is seen to be bristling with difficulties. Meanwhile local authorities are urged to provide the discovered carrier with congenial and safe work in the area in which he is discovered rather than summarily to repatriate him as has been the usual custom in the past.

4. *Leprosy*.—Fourteen years ago and before the administration of the various Leprosy Laws was transferred to this Department the expenditure on leprosy had risen to £204,000 which was recognised generally as excessive. The Department took over the administration of these laws on 1st April, 1924, when the expenditure was still £154,000 per annum. It has been steadily reduced since, although the amount required during the past financial year, namely, £97,428 was still a large sum representing as it did nearly one quarter of the total sum provided by Parliament under the Public Health Vote.

A short account of the history of leprosy will assist in an understanding why, before the administration was reorganised, so large an expenditure on this disease used to be incurred.

Under the Hebrew term PSARAATH—perhaps erroneously translated as leprosy—Moses described a symptomatology which not only referred to leprosy, as we know it to-day, but included several other skin diseases. The term was taken over into medical writings by Constantine of Carthage in the tenth century and has unfortunately become associated with a specific skin disease of low infectivity and high chronicity instead of a group of highly contagious skin infections. The perpetuation of this error has indeed been unfortunate for while the term is now associated with an entirely different symptomatology it has retained its Biblical taboo.

For many centuries sufferers from leprosy had been ostracised from society and were required to advertise their presence by special garb and clapper and the calling of "unclean". These stringent methods adopted to prevent the spread of the disease, have undoubtedly aided in clearing central Europe of the infection, but their vigorous enforcement has caused great suffering. Fortunately much has already been done towards educating the public to a better understanding of this disease, and although sufferers from leprosy are now treated with greater kindness and less dread it is still necessary that this malady of low infectivity, morbidity and mortality should be brought into a truer perspective in relation to other infectious diseases.

It is probable that leprosy originated in Northern Africa; even if this is not the case, an Egyptian record of 1350 B.C. gives an account of it occurring among slaves from the Sudan. In spite of the time that had elapsed and the possibility of its spread by tribal contact, hunters and traders, there is no evidence to show that it had until the middle of the eighteenth century reached the area at present known as the Union of South Africa. The infection was probably introduced into Southern Africa by slaves brought from the East. The first authentic cases were reported in 1756 when two European farmers of the Stellenbosch District were diagnosed as suffering from leprosy, and were subsequently segregated on their farms. Sixty-one years later the first leper settlement was started at Hemel-en-Aarde in the Caledon district, where, during the 28 years of its existence, 400 lepers and their families were given shelter and occasionally visited by the famous Dr. James Barry. In 1845 this little colony was removed from the banks of the Onrust River and established on Robben Island.

The Leprosy Repression Act of Cape Colony was only promulgated in 1884, so that until that time segregation was largely voluntary and necessarily incomplete. In spite of this and the fact that infection had been brought into non-immune virgin soil, leprosy had probably not claimed more than 3,000 victims during the 136 years that it had been known to exist prior to the passing of the Act.

The northward spread of the disease was also slow. History points to its introduction into the new Republics and the native territories by leper servants who accompanied their Voortrekker masters and by natives who left their homes to look for work in the Cape Colony, where they contracted the disease and then brought it back to their kraals.

For some years Dr. H. J. F. Wood of the Pretoria Leper Institution has been making a study of the incidence of leprosy during the 31 year period ended 1930. The results of this investigation are given at the end of this section. Here it may be mentioned that the investigation shows clearly how slow was the spread in a susceptible virgin soil of this supposedly highly contagious disease.

Leprosy, which is not a hereditary disease, is always closely associated with families because it is in family life where the most ideal conditions for its spread prevail, viz., prolonged, close, and favourable contact. It is remarkable how very frequently it happens that a member of a family—often a parent suffering from active leprosy—may expose the other members to infection for a period of years and yet no infection takes place. Both history and experience therefore afford us ample proof of its low infectivity, but at the same time history has taught us the value of segregation in dealing with a chronic infectious disease.

It may be said with certainty that the disease is definitely on the wane amongst Europeans in South Africa and it is probable that there are fewer cases amongst non-Europeans than was at one time believed.

In the lay mind leprosy is indelibly associated with loss of flesh and limbs, so it will probably cause surprise to learn that in those suffering from leprosy the flesh and extremities never "drop off". The process which causes the absorption of digits depends upon repeated injury to anaesthetic extremities, as the healing power of the flesh is rarely impaired. Another popular conception of leprosy is that all patients have cyanotic and swollen faces; this is certainly true of the advanced stages of the disease, which, like the terminal stages of most diseases, is not pleasant to witness. It is time that the public realises: (1) that leprosy is a disease caused by Hansens Bacillus which has a predilection for skin and nervous tissue; (2) that in its early stages it usually manifests itself as a comparatively mild and slow-spreading skin disease which is frequently associated with anaesthesia and (3) that it causes little discomfort and usually tends to become chronic.

In its early stages the disease is most amenable to treatment. Chaulmoogra Oil still holds the field, but the technique of preparing it for use and its administration has improved to such an extent that the disease can now readily be arrested in many cases, provided treatment can be commenced soon after the appearance of the first symptoms.

In view of the foregoing facts the five leper institutions in the Union have during the past decade changed considerably in character. Whereas previously they were institutions primarily for the segregation of lepers, they are now hospitals for the treatment of those suffering from leprosy, staffed by 5 full-time and 2 part-time medical officers, 4 lay superintendents, 3 matrons, 8 sisters, 25 European and 10 Native nurses. Each institution has a fully equipped hospital and provides facilities for research work while at the West Fort Institution, Pretoria, all the necessary facilities are provided and a medical officer specially delegated for systematic research work.

On being certified to be affected with leprosy, patients are conveyed to these institutions by motor ambulance, special rail coach or other suitable conveyance under a removal order. On admission, patients are accommodated in previously disinfected quarters and are not allowed to come into contact with other inmates until the diagnosis has been definitely established by the Medical Officer of the Institution. Careful records are now prepared of the patient's condition, charts are made showing the distribution and extent of lesions, and the possible existence of concurrent disease is enquired into. Treatment is first of all directed towards the cure of any concurrent disease that may exist, so that the field is cleared before the attack on the leprosy infection is started.

As previously stated, the chief drugs used are Chaulmoogra oil and its derivatives, and of the latter the Ethyl Esters and sodium salts of the lower melting-point fatty acids are the most popular. The drugs are mainly administered by injection, given either intramuscularly, subcutaneously or intradermally. While this, together with adequate diet and strict attention to personal hygiene, forms the chief means of routine treatment, new drugs and methods are continuously being tried out experimentally. Injections are administered once or twice weekly. As this must be continued over prolonged periods, patients are continuously encouraged to persevere, for while segregation is compulsory, the submission to treatment remains voluntary.

Patients are housed in semi-detached cottages or huts or compounds and are supplied with an adequate issue of clothing and are well fed. They are encouraged to grow vegetables and keep poultry, their produce being purchased at current contract rates for use in the institutions. The essential services of the institutions are also maintained as far as practicable by patient labour for which the workers are remunerated. In the bigger institutions the patients' areas are entirely maintained by the patient carpenters, plumbers, painters and handymen, so that most inmates are enabled to spend busy and useful days.

Annually all institutions are visited by a Medical Board. The patients are classified by the Board according to the progress of their condition during the past year, and the Board recommends which of the patients should be kept for special observation and which should be given a probational discharge. Patients certified as "arrested cases and non-effective" are not discharged from the institutions until reports have been received from the Magistrates concerned as to the suitability of their intended domiciles and until their maintenance there is assured. If the individual is without means or earning power the Government makes him a suitable monthly grant. Before discharge, as an extra precaution, every patient is required to sign an undertaking not to handle foodstuffs intended for consumption by others and to avoid coming into unnecessary contact with the public. Such patients are also required to keep the Department informed of any change in their addresses and to report themselves for re-examination by the District Surgeon twice yearly for three years and annually for a further three years before examinations are finally discontinued.

The number of patients in the institutions is shown in Table G (i), and the number of known cases remaining at their homes, at the end of June, 1934, in Table G (ii).

TABLE G (i).—LEPER INSTITUTIONS: PATIENTS THEREIN ON 30TH JUNE, 1934.

Institution.	European.		Native.		Mixed Coloured.		Asiatic.		Total.		Persons.
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	
Pretoria.....	64	31	431	268	66	36	4	5	565	238	903
Mkambati.....	—	—	139	106	—	—	—	—	139	106	245
Emjanyana.....	—	—	302	295	—	—	—	—	302	295	597
Amatikulu.....	—	—	206	113	—	—	—	—	206	113	319
Bochem.....	—	—	48	43	—	—	—	—	48	43	91
TOTAL.....	64	31	1,126	825	66	36	4	5	1,260	895	2,155

TABLE G (ii).—LEPROSY: CASES REMAINING IN THEIR OWN HOMES ON 30TH JUNE, 1934.

	Certified and Awaiting Removal to Leper Institution.	Home Segregated.	Probationally Discharged from Leper Institutions.		Total.
			Still under Surveillance.	Released from Surveillance.	
Cape (Province proper).....	—	3	131	174	308
Transkei.....	—	—	526	239	765
Transvaal.....	1	3	456	251	711
Natal.....	—	—	326	179	505
Orange Free State.....	—	—	103	46	149
UNION.....	1	6	1,542	889	2,438

The following conclusions in regard to leprosy may be made—

- (1) Leprosy is a disease prominent in the public mind merely on account of a Biblical taboo which has erroneously become attached to it.
- (2) Both history and experience afford us ample proof of its low infectivity but high chronicity.
- (3) In the early stages it is, as a rule, a mild disease affecting skin and nervous tissues. It then causes little discomfort and is very amenable to treatment.
- (4) While compulsory segregation must remain as the only sound and scientific method of dealing with leprosy in South Africa, it is essential for success that the public be educated to view the disease merely as one of the endemic infectious diseases of the country.

Incidence of Leprosy among non-Europeans during the period 1900-1930.—The following data have been collected by Dr. J. F. Wood of the Pretoria Leper Institution. The tables are self-explanatory. The first

column of figures gives the number of cases of leprosy that were certified in the district during the thirty-one year period; while in the second column the incidence per 1,000 of the non-European population per annum is shown.

The first five maps are photographs of the actual maps used at the institution which are flagged to indicate the number of cases of leprosy. Every non-European case of leprosy that has been certified in the district is

ORANGE FREE STATE.

MAP II.

Flagged Leprosy Map of the Orange Free State.—Each flag represents one certified non-European leper in the district in which the flag appears. The different shading of the flags indicates the different periods in which the cases were certified: 1900-1910; 1911-1920; 1921-1925; 1926-1930.



indicated by a flag. The difference in shading of the flags indicates the different periods during which the notifications were made: 1900-1910, 1911-1920, 1921-1925, 1926-1930. In the last map the incidence of leprosy in the whole Union is indicated by dots, each dot representing one certified case per 10,000 of the non-European population.

Numerous points of interest have appeared during the preparation of these maps; it is possible to refer only briefly to them in this short summary. Why, for example, should some areas have such a high incidence, and why should others have no incidence at all? Are economic conditions, population, recruiting or medical attention responsible for these big differences? All such possibilities will have to be investigated before a full and reasonably accurate report can be submitted. Each district will have to be investigated separately as to the high or low incidence. So far as records are available admissions are flagged in the district in which the patients became affected, not necessarily in the districts from which they were admitted.

TABLE G (iii).—LEPROSY IN THE ORANGE FREE STATE: INCIDENCE AMONG NON-EUROPEANS, CALCULATED FROM THE NUMBER OF CASES CERTIFIED DURING THE PERIOD 1900-1930, AND THE 1921 CENSUS FOR NON-EUROPEANS.

	Number of Lepers Certified.	Incidence per 1,000 per Annum.
Bethlehem.....	75	·097
Bethulie.....	12	·083
Bloemfontein.....	118	·120
Boshof.....	23	·076
Bothaville.....	15	·036
Brandfort.....	12	·049
Dewetsdorp.....	1	·007
Edenburg.....	12	·095
Fauresmith.....	14	·039
Ficksburg.....	38	·089
Fouriesburg.....	4	·017
Frankfort.....	24	·050
Harrismith.....	61	·045
Heilbron.....	38	·053
Hoopstad.....	15	·050
Jacobsdal.....	6	·071
Kroonstad.....	71	·093
Ladybrand.....	33	·050
Lindley.....	26	·053
Philippolis.....	8	·077
Reitz.....	11	·024
Rouxville.....	2	·013
Scenekal.....	51	·070
Smithfield.....	4	·038
Thaba 'Nchu.....	42	·060
Trompsburg.....	1	·014
Vrede.....	70	·098
Vredefort.....	20	·052
Wepener.....	3	·019
Winburg.....	45	·053
Zastron.....	—	—
TOTAL.....	855	·064

From the above Table it will be seen that 855 patients were admitted to institutions making 1·9 per 1,000 of the population. It appears from the map that the most thickly populated part is the Northern and Middle Free State, while the Southern Free State is relatively free. In the Northern part the incidence on the Basutoland Border is high whereas in the Southern part on the Basutoland Border, Wepener has had no admissions since 1920 and Zastron has had none at all. It is noticeable that in the whole of the Southern Free State the admissions are exceedingly few. One would like to know why Zastron has had no admissions for 31 years as it borders on the district of Herschel and Basutoland. It would appear that the Southern Free State is relatively free from Leprosy. Bloemfontein has an incidence of 3·7 per 1,000. This seems very high. It may be explained because the old leper institution at Sydenham was closed in 1912 and the old records not being well kept, showed admissions of patients from Bloemfontein who had probably not contracted leprosy there.

TRANSVAAL (EXCLUDING THE WITWATERSRAND).

MAP III.

Flagged Leprosy Map of the Transvaal.—Each flag represents one certified non-European leper in the district in which the flag appears. The different shading of the flags indicates the different periods in which the cases were certified: 1900-1910; 1911-1920; 1921-1925; 1926-1930.

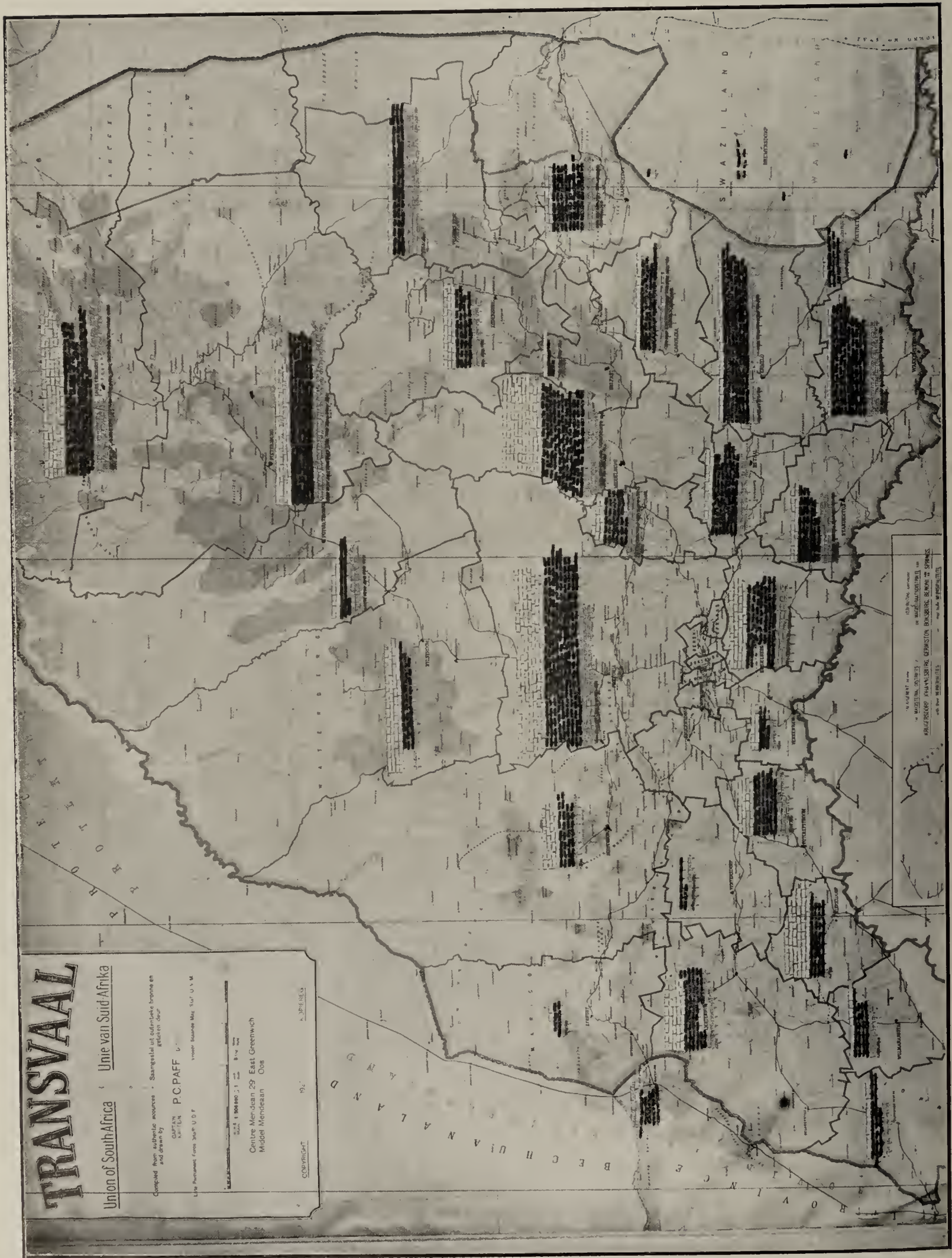


TABLE G (iv).—LEPROSY IN THE TRANSVAAL (EXCLUDING THE WITWATERS-RAND): INCIDENCE AMONG NON-EUROPEANS, CALCULATED FROM THE NUMBER OF CASES CERTIFIED DURING THE PERIOD 1900-1930, AND THE 1921 NON-EUROPEAN CENSUS.

	Number of Lepers Certified.	Incidence per 1,000 per Annum.
Barberton.....	94	·068
Belfast.....	15	·052
Bethal.....	108	·196
Bloemhof.....	45	·089
Carolina.....	70	·118
Ermelo.....	182	·168
Heidelberg.....	128	·162
Klerksdorp.....	96	·334
Liechtenburg.....	97	·121
Lydenburg.....	78	·039
Marieo.....	12	·012
Middelburg.....	260	·167
Pietersburg.....	232	·035
Piet Retief.....	29	·034
Pilgrims Rest.....	126	·076
Potehefstroom.....	83	·140
Potgietersrust.....	47	·030
Pretoria.....	370	·103
Rustenburg.....	69	·036
Standerton.....	86	·114
Ventersdorp.....	15	·035
Vereeniging.....	30	·059
Wakkerstroom.....	141	·140
Waterberg.....	108	·113
Witbank.....	59	·078
Wolmaransstad.....	47	·141
Zoutpansberg.....	233	·049
TOTAL.....	2,860	·077

The number of patients admitted is 2,860, or 2·4 per 1,000 of the population. It is noticeable that the highest incidence occurs on the border of the Vaal River. The very high incidence of 1 per cent. for Klerksdorp is probably due to the fact that during the South African War, a refugee camp was established there; this apparently attracted numerous natives who came under more careful medical examination. Records available show admissions under Klerksdorp as being from this camp. It is noticeable that the Northern Transvaal with its large population has a relatively small incidence.

NATAL.

MAP IV.

Flagged Leprosy Map of Natal.—Each flag represents one certified non-European leper in the district in which the flag appears. The different shading of the flags indicates the different periods in which the cases were certified: 1900-1910; 1911-1920; 1921-1925; 1926-1930.

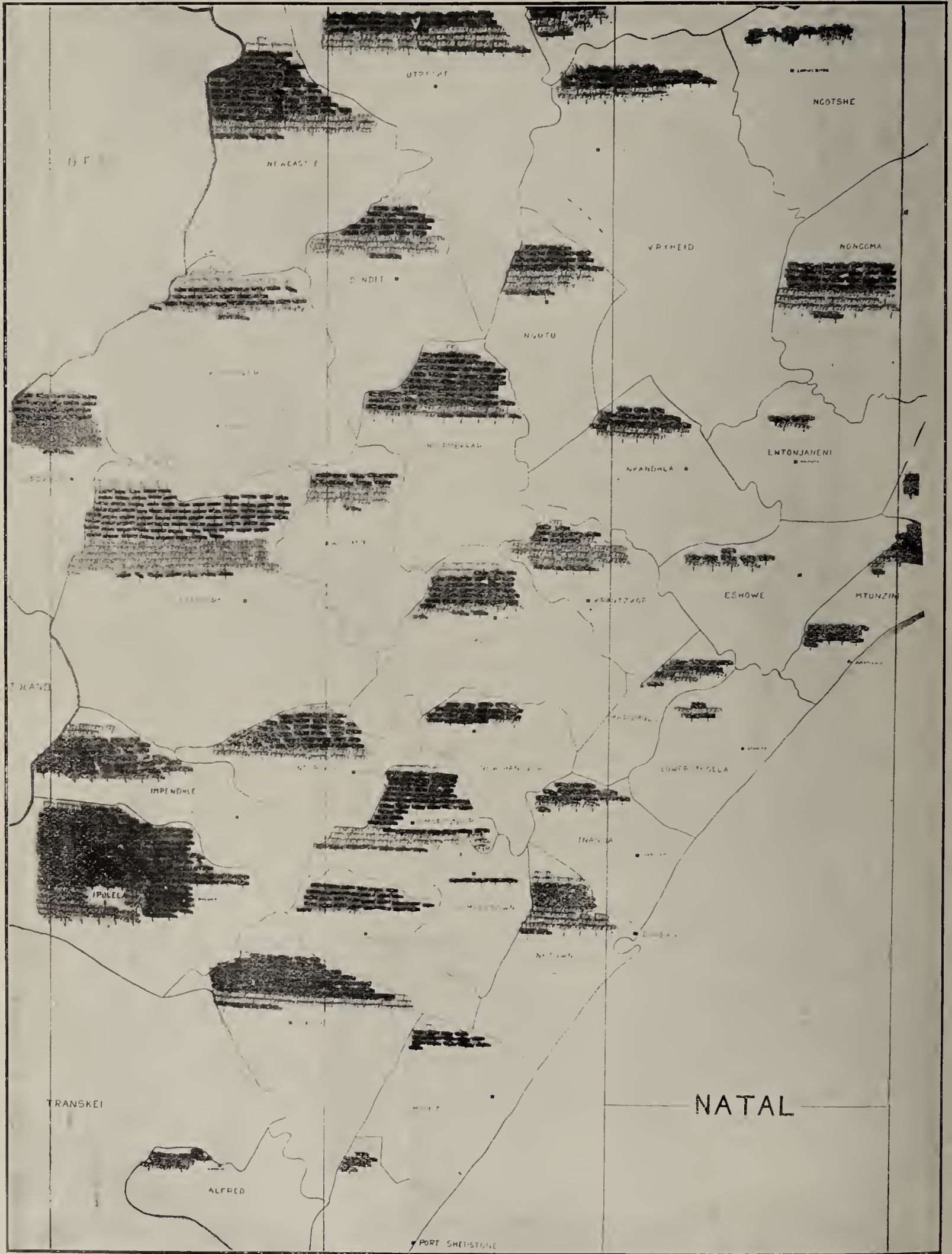


TABLE G (v).—LEPROSY IN NATAL (EXCLUDING DURBAN): INCIDENCE AMONG NON-EUROPEANS, CALCULATED FROM THE NUMBER OF CASES CERTIFIED DURING THE PERIOD 1900-1930, AND THE 1921 NON-EUROPEAN CENSUS.

	Number of Lepers Certified.	Incidence per 1,000 per Annum.
Alfred.....	11	·012
Bergville.....	40	·070
Camperdown.....	5	·009
Dundee.....	47	·046
Estcourt.....	147	·113
Helpmakaar.....	63	·033
Impendhle.....	59	·193
Inanda.....	18	·009
Ixopo.....	87	·056
Klip River.....	47	·035
Kranskop.....	31	·052
Lions River.....	56	·123
Lower Tugela.....	4	·003
Mapumulo.....	15	·015
Newcastle.....	94	·095
New Hanover.....	22	·031
Paulpietersburg.....	25	·062
Pietermaritzburg.....	76	·058
Pinetown.....	43	·033
Polela.....	169	·216
Port Shepstone.....	4	·004
Richmond.....	34	·047
Umvoti.....	49	·048
Umzinto.....	16	·009
Utrecht.....	58	·073
Vryheid.....	35	·024
Weenen.....	25	·038
Entonjaneni.....	5	·009
Eshowe.....	10	·008
Mtunzini.....	13	·017
Nkandhla.....	24	·024
Nqutu.....	33	·036
Lower Umfolozi.....	2	·004
Nongoma.....	57	·016
TOTAL.....	1,424	·039

The number of patients admitted is 1,424 making the incidence 1·2 per 1,000. It is noticeable on comparing the Natal Coast with the Cape Province that the incidence of leprosy is very small in Natal. The high incidence of leprosy along the Basutoland Border of Natal is very noticeable, especially at Impendhle, Polela and Lions River.

CAPE PROVINCE (EXCLUDING NATIVE TERRITORIES).

MAP V.

Flagged Leprosy Maps of portions of the Cape Province other than the Native Territories.—Each flag represents one certified non-European leper in the district in which the flag appears. The different shading of the flags indicates the different periods in which the cases were certified: 1900-1910; 1911-1920; 1921-1925; 1926-1930. The two small Maps represent the Northwest Cape and Cape Peninsula.

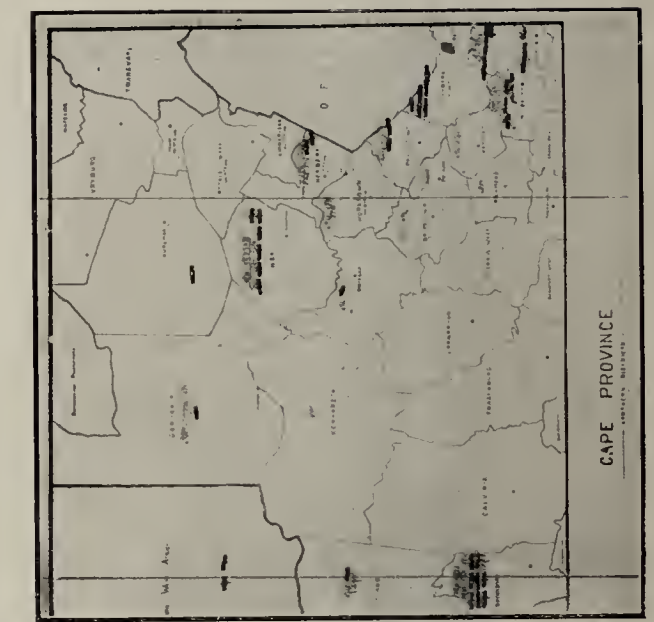
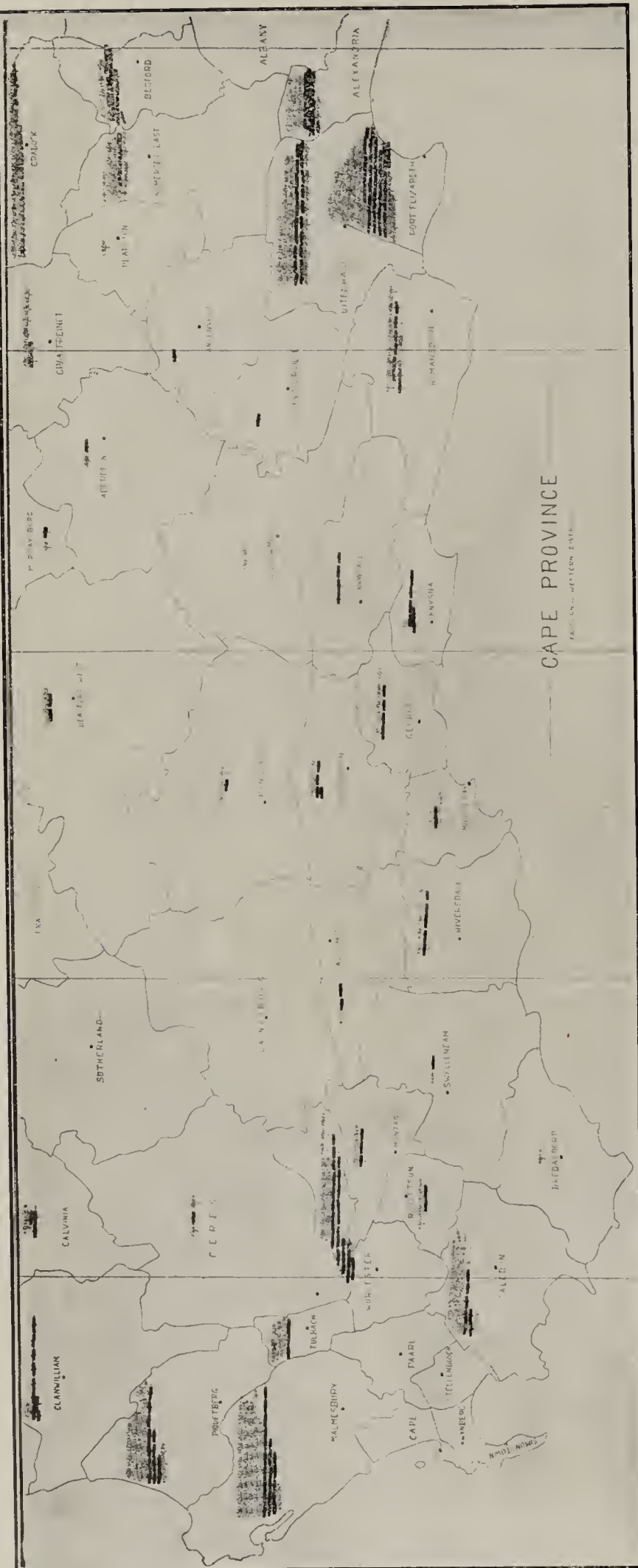


TABLE G (vi).—LEPROSY IN THE CAPE PROVINCE (EXCLUDING THE NATIVE AREAS): INCIDENCE AMONG NON-EUROPEANS, CALCULATED FROM THE NUMBER OF CASES CERTIFIED DURING THE PERIOD 1900-1930, AND THE 1921 CENSUS FOR NON-EUROPEANS.

	Number of Lepers Certified.	Incidence per 1,000 per Annum.
Aberdeen.....	2	.016
Adelaide.....	9	.043
Albany.....	66	.103
Albert.....	21	.067
Alexandria.....	29	.089
Aliwal North.....	38	.109
Barkly East.....	22	.116
Barkly West.....	18	.020
Bathurst.....	9	.026
Beaufort West.....	5	.020
Bedford.....	19	.080
Bredasdorp.....	1	.007
Britstown.....	2	.022
Caledon.....	29	.090
Calvinia.....	5	.017
Cape.....	162	.069
Carnarvon.....	0	—
Catheart.....	20	.054
Ceres.....	3	.021
Clanwilliam.....	10	.051
Colesberg.....	6	.026
Cradoek.....	35	.091
De Aar.....	1	.007
East London.....	131	.113
Fort Beaufort.....	22	.065
Fraserburg.....	0	—
Glen Grey.....	157	.117
George.....	9	.033
Gordonia.....	5	.019
Graaff-Reinet.....	8	.021
Hanover.....	2	.021
Hay.....	12	.044
Herbert.....	6	.020
Herschel.....	167	.142
Hopetown.....	3	.030
Humansdorp.....	17	.043
Jansenville.....	1	.005
Kenhardt.....	1	.004
Kimberley.....	19	.020
Kingwilliamstown.....	394	.136
Knysna.....	7	.035
Komgha.....	77	.182
Kuruman.....	1	.002
Ladismith.....	3	.022
Laingsburg.....	0	—
Mafeking.....	31	.033
Malmesbury.....	67	.106
Maraisburg.....	4	.043
Middelburg.....	11	.038
Molteno.....	19	.107
Montagu.....	6	.061
Mossel Bay.....	6	.030
Murraysburg.....	2	.020
Namaqualand.....	3	.006
Oudtshoorn.....	7	.012
Paarl.....	67	.102
Pearston.....	1	.010
Peddie.....	38	.058
Philipstown.....	4	.038
Piquetberg.....	38	.148
Port Elizabeth.....	81	.081
Prieska.....	2	.013
Prince Albert.....	4	.038
Queenstown.....	55	.065
Richmond.....	1	.008
Riversdale.....	9	.048
Roberston.....	6	.035
Simonstown.....	7	.038
Somerset East.....	21	.057
Stellenbosch.....	64	.121
Sterkstroom.....	8	.053
Steynsburg.....	9	.074
Steytlerville.....	1	.009
Stockenstroom.....	23	.083
Stutterheim.....	26	.066
Swellendam.....	2	.008
Sutherland.....	0	—
Tarkastad.....	11	.049
Taungs.....	22	.034
Tulbagh.....	12	.072
Uitenhage.....	54	.093
Uniondale.....	0	—
Van Rynsdorp.....	14	.112
Victoria East.....	26	.061
Victoria West.....	0	—
Vryburg.....	6	.009
Williston.....	0	—
Willowmore.....	2	.014
Wodehouse.....	30	.088
Worcester.....	41	.097
Wynberg.....	89	.069
TOTAL.....	2 488	.051

TRANSKEIAN TERRITORIES.

MAP VI.

Flagged Leprosy Map of the Transkeian Territories.—Each flag represents one certified non-European leper in the district in which the flag appears. The different shading of the flags indicates the different periods in which the cases were certified: 1900-1910; 1911-1920; 1921-1925; 1926-1930.

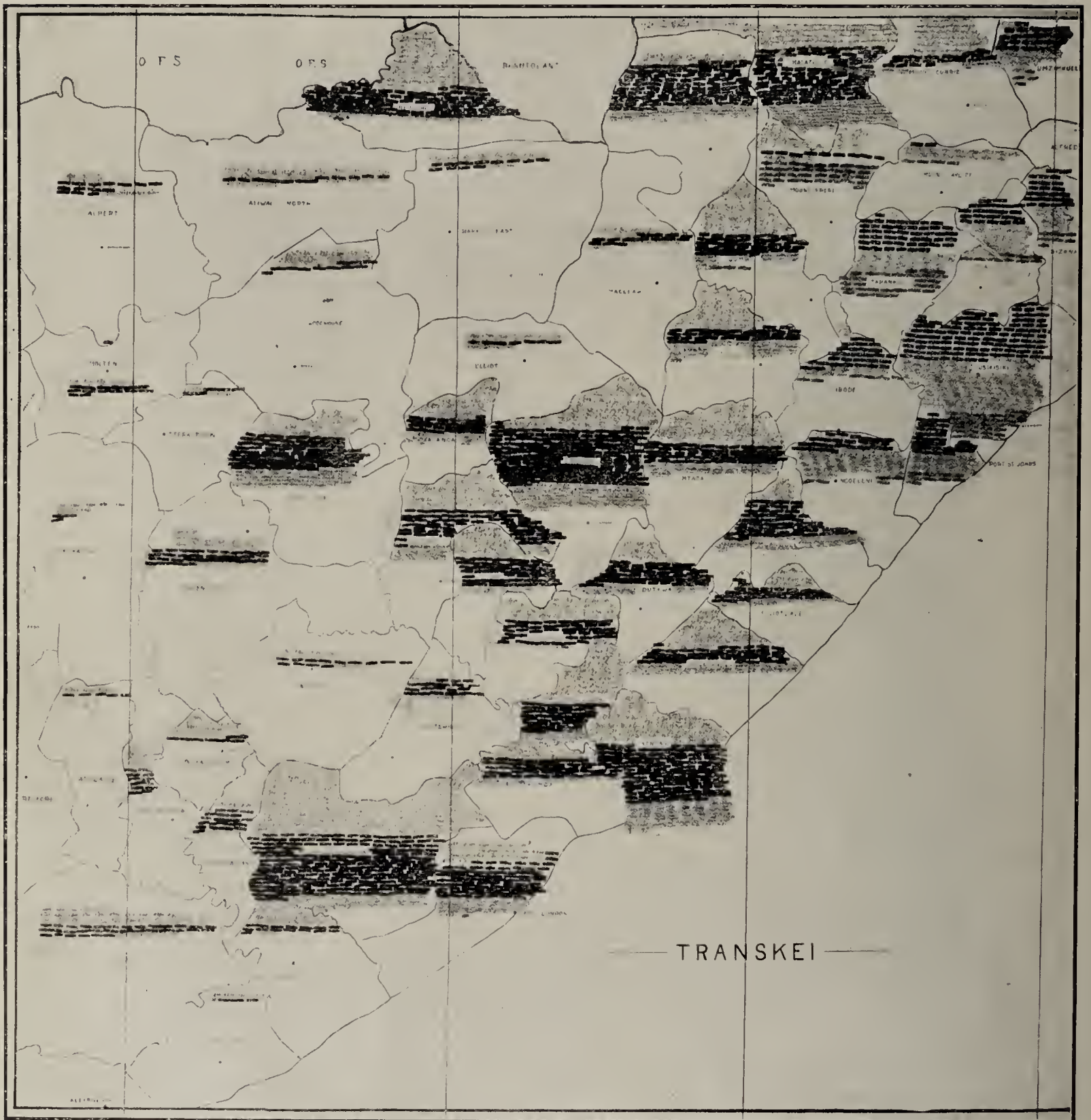


TABLE G (vii).—LEPROSY IN PONDOLAND: INCIDENCE AMONG NON-EUROPEANS, CALCULATED FROM THE NUMBER OF CASES CERTIFIED DURING THE PERIOD 1900-1930, AND THE 1921 NON-EUROPEAN CENSUS.

	Number of Lepers Certified.	Incidence per 1,000 per Annum.
Bizana.....	35	·025
Flagstaff.....	45	·045
Libode.....	70	·078
Lusikisiki.....	208	·124
Ngqeleni.....	120	·095
Port St. Johns.....	107	·161
Tabankulu.....	91	·073
TOTAL.....	676	·085

TABLE G (viii).—LEPROSY IN TEMBULAND: INCIDENCE AMONG NON-EUROPEANS, CALCULATED FROM THE NUMBER OF CASES CERTIFIED DURING THE PERIOD 1900-1930, AND THE 1921 NON-EUROPEAN CENSUS.

	Number of Lepers Certified.	Incidence per 1,000 per Annum.
Elloit.....	18	·111
Elliotdale.....	50	·052
Engcobo.....	291	·158
Mqanduli.....	90	·070
St. Marks.....	130	·112
Umtata.....	140	·098
Xalanga.....	62	·132
TOTAL.....	781	·110

TABLE G (ix).—LEPROSY IN TRANSKEI: INCIDENCE AMONG NON-EUROPEANS, CALCULATED FROM THE NUMBER OF CASES CERTIFIED DURING THE PERIOD 1900-1930, AND THE 1921 CENSUS FOR NON-EUROPEANS.

	Number of Lepers Certified.	Incidence per 1,000 per Annum.
Butterworth.....	104	·166
Idutywa.....	83	·085
Kentani.....	254	·201
Nqamakwe.....	76	·072
Tsomo.....	85	·101
Willowvale.....	115	·087
TOTAL.....	717	·122

TABLE G (x).—LEPROSY IN GRIQUALAND EAST: INCIDENCE AMONG NON-EUROPEANS, CALCULATED FROM THE NUMBER OF CASES CERTIFIED DURING THE PERIOD 1900-1930, AND THE 1921 CENSUS FOR NON-EUROPEANS.

	Number of Lepers Certified.	Incidence per 1,000 per Annum.
Maclear.....	28	·159
Matatiele.....	227	·171
Mount Ayliff.....	33	·052
Mount Currie.....	52	·102
Mount Fletcher.....	146	·177
Mount Frere.....	67	·050
Qumbu.....	108	·100
Tsolo.....	108	·103
Umzimkulu.....	156	·123
TOTAL.....	925	·112

Pondoland: 676 patients were admitted, making the incidence 2·6 per 1,000 of the population.

Tembuland: 781 patients were admitted, making an incidence of 3·3 per 1,000. This incidence appears high. It may be explained by the fact that it is largely a recruiting area for the Witwatersrand Native Labour Association and many patients are discovered at the Recruiting Offices or on arrival on the Mines.

Transkei: 717 patients were admitted, making an incidence of 3·7 per 1,000. The high incidence is probably due also to diagnosis among mining recruits.

Griqualand East: 925 patients were admitted, making an incidence of 3·7 per 1,000. The high incidence of Mount Fletcher and Matatiele is striking. Both districts border on Basutoland. They contrast noticeably with the Southern Free State districts.

The Whole Union: The accompanying map (map No. VII) shows the relative incidence of leprosy in the non-European population of the Union during the period 1900-1930.

Relative Incidence of Leprosy in Non-European Population during the Period 1900-1930.

NOTE.—Each dot represents one certified case in 10,000 of population.

MAP No. VII.



The striking fact emerges from examination of Map VII that there has since 1920 been a marked decrease in the number of patients admitted to the leper institutions from the southern districts of the Cape. The patients came very largely from among the Cape Coloured population and chiefly from the coastal areas. The Karroo produced practically no cases; many districts have had few or no cases since 1920. The incidence increases steadily as the Native areas of the East are approached.

5. *Malaria*.—This subject is of such great importance that a full account of the disease and measures adopted to combat it in the Union is warranted. The description will be given under five heads:—

- A. Malaria Control in Natal and Zululand.
- B. Tzaneen Field Station.
- C. Orange and Kuruman River Areas.
- D. Pongola Irrigation Works.
- E. Railway Areas.

The last two of these are dealt with in greater detail in annexures to this report (Annexures D and E).

A. *Malaria control in Natal and Zululand*.—With the exception of four districts there has been fever in every part of the Province during the past five years, and the disease has been noted up to 5,000 feet above sea level.

The season 1929-30 was characterised by very severe epidemic malaria mainly on the coastal belt.

That of 1930-31, a somewhat drier year, showed a lessened intensity, but much more widely spread incidence of the disease.

The 1931-32 season was wet. Very serious epidemic malaria occurred on a wide scale, deaths from this disease being estimated at about 10,000.

The 1932-33 season was much drier, resulting in diminished breeding facilities for *Anopheles gambiae*. Malaria occurred on the same wide area, but with a much diminished incidence. This was due primarily to climatic factors, but also to the increased resistance of the population (in parts), to the more effective use of quinine in the native areas and to a commencement of preventive work on an organised basis in the newly formed committee areas on the coast.

The 1933-34 season, now under review, has been exceptionally wet and humid, and warm weather persisted a month over time into May. Generally speaking, conditions were far more favourable to an epidemic as compared with the bad season two years ago. Breeding of *A. gambiae* occurred on a large scale on account of continuous wet weather and at times became quite uncontrollable. The stage was set for a major epidemic. This did not eventuate.

Cases of fever occurred, however, over a wide area of the Province. Some were of serious type, such as cerebral malaria, and there were some cases of Blackwater fever. But it is pleasing to record that the proportion of deaths to cases has been far lower than can be remembered, and that, notwithstanding the exceptional mosquito breeding conditions, there was infinitely less fever than the experience of many a previous season would lead one to expect. This can only be attributed to the fact that the whole population, European, Asiatic and Native, south of the Umfolosi is gaining knowledge of malaria control and is becoming malaria-minded. It is turning its attention to preventive measures on an organised basis as well as fighting the disease by immediate treatment as soon as it occurs. To achieve this outlook on behalf of the whole population, white and black, and to attain local organisation of preventive measures not only in the European communities on the coast and inland, but also throughout the extensive native areas, is the aim of the Department, and has been set in the forefront of its programme since malaria appeared with epidemic intensity in 1929.

The European communities on the coast have this year had the first real test of their organisation and have reason to be gratified at the result. Fever in the coastal strip is of prime economic importance; its control there is imperative and is already extensively organised as will be shown later. The real malaria problem now lies in the immensely greater area of the hinterland. This is occupied by farms and by native reserves situate mainly in the large river valleys and is very difficult of access. These reserves have not always suffered as heavily as the sugar belt, but until they are effectively dealt with will always provide a human reservoir of fever in their native population. The Department, while effecting the extensive organisation of control which the institution of local authorities by the Province made possible in the sugar belt, has found it more difficult to deal with the much greater inland farming areas where the provincial authorities may not be able to improvise local government and it has had to rely mainly on

voluntary organisations. These farming areas have problems of their own, that of the labour farm with absentee owner being the most serious.

The elimination of fever in Natal, south and west of the Umfolosi, depends on success or failure of control in the native reserves where the population liable to be affected amounts, according to the 1921 census, to 993,847, and the Department has concentrated on this native problem for the past five years. It was never considered possible to dragoon such a population, ignorant, suspicious of European methods and intentions and situated for the most part in difficult terrain, into taking measures for their treatment and protection. The native population had to be convinced of the utility of our procedures by demonstrations of preventive measures on the large scale over a period of months and by effective treatment of the disease at the kraals by their own people. It is gratifying to record that there is now no objection to quinine medication, except on the part of some sects who object to take medicine of any kind, but are not opposed on religious grounds to hut-spraying. Further, the kraal native is learning the value of early treatment and in consequence there is a vastly diminished number of parasite carriers about. But the greatest advance made has been in preventive measures, specially by the introduction of focal schemes.

General larval control in native areas is impractical at present, except in organised communities as that of the Msinga Native Council. The Department, however, sees an opportunity of instituting preventive measures in reserves which, if carried out on a sufficiently extensive scale, will solve the "reservoir problem". This consists of supervised spraying with insecticide of dwellings, with or without limited larval control, and it has been tried out on a large scale during the past season. Our efforts at control of the disease directed, as they are in the main, against adult malaria-bearing anopheles, are being watched with interest in other malarial countries, representatives of which have visited Natal for the purpose.

The departmental staff available to cope with malaria during the period (October, 1933, to June, 1934, was as follows:—

- 1 Senior Assistant Health Officer (Dr. G. A. Park Ross) in administrative control of the Province of Natal.
- 1 Assistant Health Officer (Dr. F. W. P. Cluver) in charge of the coastal areas.
- 1 Malaria Medical Officer (Dr. A. L. Ferguson) in charge of the inland areas.
- 1 Government Pathologist (Dr. B. Sampson) in charge of the Laboratory at Durban.
- 1 Senior European Malaria Inspector (Mr. S. Hamilton).
- 5 Regional European Malaria Inspectors.
- 4 European Laboratory Assistants.
- 15 Senior Native Malaria Assistants.
- 45 Native Malaria Assistants.
- 80 Native Sprayers.

It should be mentioned that the professional and laboratory staff had other public health duties to perform in addition to their anti-malaria work.

In local authority areas the European staff of the Department advises and checks over the work of local authority staffs, except in the two major municipalities. In other European areas, mainly inland, this staff had, in addition to the duties above-mentioned, the organisation of voluntary control and executive functions and in places the actual carrying out of anti-malarial work where it has not, up to the present, been possible to have local government instituted.

In the native areas the whole executive campaign devolves on this Department *via* its inspectors, native malaria assistants and sprayers who work under the magistrates in their respective districts.

One of the most important functions of the Department is the maintenance of an intelligence service with regard to anopheline breeding, invasion of dwellings by adults, etc., not only during the season, but before the disease is expected to appear. It is only by the institution of this service and the taking of measures beforehand that outbreaks of malaria can be effectively checked before they develop. These steps are imperative if prevention of the disease is to be satisfactory. In this respect a properly conducted anti-malaria campaign differs essentially from the procedure common to other epidemic diseases where measures mainly fall to be taken after the disease has broken out. The Laboratory service is, therefore, very important not only to the departmental staff, but to local authorities and other organisations who receive free information and notification of the mosquito position throughout the Province. The work entailed is heavy, specimens examined and reported on for our own staff and for local authorities and others amounting to as many as 300 per diem at certain periods of the season.

During the winter months our staff of European inspectors and 20 of the best native malaria assistants are kept fully employed mainly in native reserves dealing with foci of disease, carriers, etc., and, in particular, working out focal schemes to be put in operation when the full staff carries on in October. It might be of interest to note that certain of the schemes worked to last season were got out in detail by senior native malaria assistants of five years' standing checked over by the European staff and put into successful operation.

In addition, the European winter staff have an opportunity of inspecting and reporting on defective housing conditions on estates, etc., and investigating the conditions under which winter breeding takes place. This is a subject on which detailed investigation is urgently necessary, and the Department has requested that it be placed in the forefront of the programme of the South African Institute for Medical Research when a Research Station is established in the near future in Zululand.

Work done by Local Authorities in Natal—Durban.—The measures carried out during the previous season and detailed in the last Annual Report were continued. This applies more particularly in respect of permanent measures involving major engineering works. The need for an enlarged aerodrome has occasioned increased activity in the reclamation work of the Eastern Vlei and the elimination of troublesome breeding places there is now within sight.

The difficulty of dealing in an adequate manner with all breeding places during the wet season under review has been stressed and admitted by all other local authorities who have in their areas supplemented anti-larval work by systematic spraying of dwellings. The Durban Corporation has, on many occasions, represented their desire to control all Government properties in the Borough with a view to securing uniformity of methods. The Government Department principally interested is the South African Railways and Harbours, and representations have been made that the main malaria danger in Durban comes from the head of the Bay where the Railway Administration is responsible for approximately one-sixth of the area indicated. This Department cannot agree that the threat to Durban is so restricted and returns from the Addington Hospital bear this out. While uniformity of control may be desirable in principle, it is felt by the Railway Administration that it has a responsibility towards its employees. These are housed mainly in a settlement at the head of the Bay and also in the Point area. It feels that it cannot delegate malaria control to the Corporation at this stage, and the Department agrees with the contention of the Administration, more especially as the control measures hitherto instituted by the Administration have been shown to be thoroughly effective. Investigation has shown that the incidence of fever has been negligible on Railway controlled areas at the head of the Bay where measures, such as insecticidal spraying of dwellings, additional to the anti-larval measures employed by the Corporation, are practised by the Administration. The whole matter was discussed at a Conference held on the 20th April, 1934, and an offer by the Corporation to do the control for one year as an experiment was rejected. As an alternative the Railway Administration proposed that it should control two square miles of Borough land around Wentworth, Booth and Point, where most of the Railway employees live, and also institute a complete mosquito control (all species) at the Point. This is held to meet the Borough's contention that the reputation of the Port might be prejudiced in respect of *Aedes* infestation (the carrier of Dengue Fever). In exchange the Corporation would control the Railway properties (approximately two square miles) in the rest of the Borough which are largely non-residential. This Department supports the Railway Administration's point of view and considers that in view of the proved efficacy of its methods the time is not ripe for an acceptance of the Borough's proposition.

Pietermaritzburg.—The methods used in this Borough closely approximate those recommended by the Department in that, in addition to anti-larval control, a feature is made of insecticidal work and slum visitation by trained non-Europeans who work in conjunction with malaria dispensaries and under the European inspectors. The provincial authorities having failed to institute local government in the area immediately surrounding Pietermaritzburg, and the City Council having refused to enlarge its boundaries, the Department was forced to organise an anti-malarial control in the peri-Pietermaritzburg area. This took the form of a contract with the Pietermaritzburg Corporation who employed an additional anti-malarial staff working under the direct supervision of the Medical Officer of Health, an arrangement which proved most efficient and economical.

Other Municipal Areas.—The arrangements in these do not call for any special comment except that in every case the Department was consulted and indicated appropriate measures following for the most part those detailed under Pietermaritzburg.

Other Statutory Bodies.—In the smaller local authorities, including townships, health boards and health committees, anti-malaria work in most cases has proved to be the major public health activity. The work in these areas was undertaken on lines approved, and in most cases suggested, by the Department.

Malaria Committees.—These are statutory bodies constituted under Provincial Ordinance No. 11 of 1932. They are established in rural areas for the sole purpose of controlling malaria. They are required to employ whole-time European malaria inspectors who have been in every case trained by the Health Department which contributes a subsidy of 25 per cent. of the salary and travelling expenses of this inspectorate.

The malaria committees have each their own regulations and rating powers. Except Muden, a citrus area in the Weenen district, they are all situated in the sugar belt on the coast along which they extend in a chain, unbroken except by other local authorities and controlled native reserves, from the Umfolosi River in the north to Umzimkulu River in the south (in all some 250 miles).

These committees exercise surveillance over sugar estates for the most part, and all owners and occupiers in their areas are required to carry out their own individual preventive measures. In some cases these preventive measures may be very extensive, involving a very considerable staff. The expenditure on one large estate is approximately £3,000 per annum, and is considered money well spent. The control in many cases is excellent and, in spite of the nature of the terrain and the heavy crop cover, malarial mosquitoes and fever have been practically banished, and it has been quite unnecessary to use mosquito guards. In other cases, even in the vicinity of well controlled estates, the performance of anti-malarial work has been perfunctory and occasionally non-existent, with the result that there have been outbreaks of fever. These outbreaks have been localised, but serious in type, a circumstance which points to the imperative necessity for adequate control. In certain areas committees have been so seriously concerned with these happenings that they are considering the establishment of an organisation to carry out the work themselves on all properties in their areas. The main difficulty appears to arise from that class of estate owner who is unprepared to give adequate supervision to the measures he inaugurates on his own estate. Committees, in some cases, have not been as firm as is desirable in dealing with such owners and in supporting the recommendations of their own inspectors in regard to such individuals even when backed up by the Department's inspectors.

In justice to the committees, however, it must be pointed out that at the outset they started with unfortunate regulations which have now been largely amended by the provincial authorities. It is trusted that a firm application of the amended regulations will result in more effective control in future.

Inland Areas.—Since the epidemic year 1932-33, the inland areas have had to receive an increasing share of the Department's attention. The problem is in many ways more complex than that presented by the coast in that there are four different levels of country presenting different sets of problems to be considered in each case. These might be defined as follows:—

- (a) Areas lying below 1,200 feet, including the Tugela River up to the Umfongosi.
- (b) Areas lying below 3,000 feet (the thorn country), including large portions of the main river valleys, viz., the Tugela, Umgeni and the Umkomaas where the most severe outbreaks of the past season have occurred.
- (c) Areas lying below 4,500 feet (the wattle belt) where fever was very severe during the previous rainy season, but has been held down this year.
- (d) Areas lying above 4,500 feet where fever occurs, but has never been widespread.

These areas approximate 20,000 square miles with a population of 976,000. Rains were general and plentiful throughout the area with not infrequent floods. The temperatures, which ranged between 65° F. and 75° F., were fairly constant all over.

The season was a wet one.

Control in the European portion of the Natal inlands was attempted during the previous year by means of 28 voluntary committees. It was not altogether successful. The Department had not sufficient staff to supervise the work effectively. To cope with the European and Native sections of the inland areas as a whole, during the year under review the following staff was made available:—

1 Medical Officer (Dr. A. L. Ferguson),
 3 European Inspectors of the Department,
 23 Departmental Native Malaria Assistants,
 29 Native Sprayers,

in addition to which temporary employment on focal schemes was given to 3 European supervisors and 1 European sprayer.

Our inspectors confined their attentions to operations in the rural districts and native reserves, but the advice of the medical officer was available for the guidance of statutory local bodies of which there are 18, including the Native Council at Msinga.

The inland districts outside the area of the local authorities comprise European farming communities on the uplands and large native reserves in the broken river valleys. The population is not nearly so dense as on the coast, being approximately 48 to the square mile. A few of the wattle companies have large numbers of employees housed in barracks which enables them to exercise control as in the sugar belt, but the area is not so well suited for local government by malaria committees as on the coast. At present there is only one malaria committee, viz., that at Muden.

Places like Albert Falls, Krantzkop, etc., should have local government, but over a large portion of the area we could not work malaria committees on the coastal lines at least for the present. Our staff was, therefore, set to see what improvement could be effected among the voluntary committees most of whom refused to function at the beginning of the season. Fifteen European voluntary control schemes were eventually established, three of which subsequently dissolved themselves, but individuals carried out their own anti-malaria measures. The same obtained in other places where the Department failed to form voluntary committees as at Otto's Bluff. The Natal Tanning Extract Company, at four centres, carried out an extensive and satisfactory control on their own properties on coastal lines.

These voluntary schemes consisted in each case of groups of farmers employing staff trained by the Department to do their spotting, spraying and insecticide work. In some cases their organisation was very satisfactory, in others it was ineffective. Where the control measures failed in an area ear-marked for local control, as at Albert Falls, the Department carried out anti-malaria measures pending the institution of such local control.

The year's working has clearly shown that a voluntary system conscientiously worked can be successful. Its drawbacks, however, are inherent. Now that the Department is making headway in native reserves, which in many cases adjoin these areas, it is absolutely essential that parallel working should obtain, and it might be necessary, where voluntary working fails, to institute local government in order to ensure that the control measures over the area as a whole are not prejudiced by negligence at one particular point.

The Department, however, has been faced with a very grave difficulty, viz., the existence of native labour farms with absentee or poverty-stricken landlords. The Chief Native Commissioner has represented the position to this Department quoting the view of Chief Mguquka of Camperdown district which is representative of the views generally held in regard to this matter. This Chief protests against differentiation in the treatment of natives living in native areas as compared with those living on privately-owned land in so far as anti-malaria measures are concerned. He stresses the fact that many large farms in his district are owned by absentee landlords from whom little assistance can be expected. He points out that natives on private lands paid the same general tax as those living in reserves and asked that these matters be submitted to the proper authorities for consideration. This Chief's protest is fully met in regard to issues of quinine, but the issue of quinine is now a minor affair in the Department's scheme of malaria control. The Department, as will be shown, has instituted preventive measures in reserves by insecticidal and other operations. The Msinga District Council has done likewise in its area, the population of which is 87,000. There is no machinery, however, to provide a similar organisation for the large number of natives living on private farms, and until such provision is made they are a danger to themselves and to their neighbours. This is a serious problem not only in the Camperdown and neighbouring districts, but especially in the neighbourhood of Weenen and Blaauwkrantz.

The European voluntary committees have indicated their satisfaction with the help given by this Department's staff, more especially in the location of *Gambia* breeding places and in the advice given as to control methods generally. There is no doubt that the greatly increased surveillance exercised during the recent malaria season has been greatly appreciated, and the population generally of the inland districts is taking an increasing interest in measures designed for its own protection.

Natal Native Reserves.—On the advice of Professor Swellengrebel, no anti-malarial work is being attempted in the Hlabisa, Ubombo and Ingwavuma districts north of the Hlulhuwe where malaria is endemic. Fever occurs the whole year round in the coastal area of these districts, but is rather worse in the summer months. The incidence of the disease this year is only normal. Europeans and non-immune natives run a risk of contracting fever even in the winter months. In summer the risk is very grave indeed. Fever can be avoided by taking proper precautions, bearing in mind that infection is almost invariably contracted when one is asleep or at rest.

The local natives do not suffer from epidemics; the adults have a partial immunity against the disease and are employed with great advantage on sugar estates in the northern part of the sugar belt where conditions are unsuitable for non-immune labour.

The main mass of the Natal reserves, with a population of approximately one million natives, is interwoven with European areas. An incidence of fever in the one affects the other and *vice versa*. These reserves are situated mainly in the great river valleys, in thorn country and abut on the coast in places. Many are in very difficult terrain, some of the most heavily populated being inaccessible to vehicles. Horse sickness is very prevalent and animal transport may be impossible. Added to this, communication is often interrupted by floods. This may be a serious matter as evidenced during the past season when at one point our staff with quinine supplies, etc., could not reach an isolated community with the result that out of about 100 new infections over 30 persons died.

In order to appreciate the state of affairs as it exists to-day, one has to survey the position for the past five years.

The Department was faced in 1929 with a very serious epidemic of fever occurring mainly in coast reserves and on the lower reaches of the Tugela in a native population ignorant, superstitious and distrustful of the white man's intentions, a distrust fomented by their own native herbalists. It was necessary at the outset to demonstrate to this population that not only could the disease be effectively treated in their own homes by their own people, but, further, that they could prevent it. Dépôts for free issue of quinine, salts and tonic pills were accordingly established. Educated natives were given a clinical training in the treatment of cases and of complications. These native malaria assistants demonstrate to the people in the kraals how to treat themselves and make the most effective use of the resources at their command. They also explain how the disease is caused and they show how it can be avoided.

The Department has always considered the educational side of its campaign of the utmost importance from the point of view of teaching people how to help themselves rather than allowing them to stand by and watch measures being taken for their benefit.

There are now 400 dépôts established throughout Natal and Zululand and 60 trained native malaria assistants. In the early stages these men were employed in treatment, plus propaganda; now their main function is not so much treatment as intelligence work and prevention.

It has been stated that the disease is now more widespread than it was in 1929. The progress of its control has followed the same sequence in each newly infected centre.

At first the population is suspicious, even hostile, and at best indifferent until the effects of treatment are noted. We have had malaria assistants assaulted, possibly at the instigation of native herbalists. Many of the latter, however, have died of fever and the bulk of those remaining have been driven to include quinine in their armamentarium, because their clients expect a drug which is at the least as good as that obtained from Government. Ingenious devices have been employed to disguise the drug in spite of its characteristic taste. These usually fail. In a recent instance, however, the herbalist, taxed by his patient with trying to sell him ordinary quinine, pointed out that whereas the Government supplies were undoubtedly suited to white people, as witness their uniform whiteness, his had a black spot without which the tablets were useless for natives. He had bored a hole in each tablet and filled it with a mixture of soot and fat.

Ideas have been spread that one or other proprietary preparation was the only effective remedy, or that injection, intravenous or intra-muscular, was the only method by which quinine should be administered, all notions which for a time reaped a rich harvest for their sponsors. These have proved to be passing phases among natives, and the mass of the population uses tablet quinine dissolved in water and taken in a dosage based on that recommended by the Malaria Committee of the League of Nations (Third Report). Full instructions in Zulu are published in a leaflet supplied with every issue of quinine.

The progress in malaria control in Native areas presents this anomaly: Those reserves (no matter how backward general development may be) which first experienced severe fever and were taken in hand are now the most advanced in malaria control. Others, even those comparatively near European centres as in the Umgeni Valley or in the South Coast hinterland, which only experienced severe fever recently, are less advanced and just beginning to take a practical interest in our campaign. This bears out Professor Swellengrebel's dictum that in a campaign against the fever, malaria itself is the best teacher. To illustrate this point, it is of interest to note that in many of the most "backward" parts of Zululand infected five years ago, natives are buying spray pumps. On South Coast reserves, which were only recently infected and that not so severely, the departmental staff is still encountering passive resistance.

The first district to be tackled on a comprehensive scale was that of Msinga (population 87,000) where there is a district Council and local revenue. The Msinga district has a reputation for faction fighting on a grand scale. There is a very progressive element situated on the Native Trust Irrigation Works on the Tugela and Mooi Rivers. Malaria control by larvicides of a section of the irrigation area was begun in 1930, and was so successful that the Council offered to take over the organisation which the Department had primarily established for demonstration purposes. In the following season, the zeal of the Council outran its discretion in that they attempted too much, but the interest of the natives in general had been successfully aroused to an extent that they demanded a very much increased staff and extended activities. As elsewhere anti-larval control proved insufficient and had to be supplemented by hut-spraying. The district is now divided into two sections, one controlled by the Council's head native malaria assistant with a large staff of sprayers, and the other by a European official of the Native Affairs Department.

The work is proving very effective and economical, and relations with the neighbouring malaria committee of Muden, who are working on parallel lines, are most satisfactory. No other native district in Natal administers its own revenue, and it will not be possible to organise on exactly similar lines elsewhere.

Another control scheme was introduced last season at Impolweni Mission Reserve (3,000 population) which has been successful in spite of difficulties.

In two other instances on the coast very grave difficulties were encountered. On the Umvoti Mission Reserve and Mnini Native Trust great difficulties were and are still being encountered, but our experience at Msinga and Impolweni justified the introduction of focal schemes at selected points in the native reserves in general, and these schemes, numbering in all 34, have, during the past season, been an unqualified success. It is hoped to extend them very considerably in the coming season.

It has been shown that anti-malaria control is perfectly feasible in a native area, always provided that it has had a sharp epidemic as a preliminary and that methods of control are introduced tactfully.

By instituting focal schemes early in each season at places which are known foci of the disease and from which experience has taught us to expect a recrudescence in and spread of fever from, the Department hopes to be in a position to control the disease generally and more particularly in the great river valleys where most of our schemes have been located. These schemes cover areas of varying extent and each comprises anything from 300 to 1,100 huts. Groups of such schemes are placed under the regional European Inspectors. In immediate charge of one or more schemes is a trained native malaria assistant, preferably one who has done the original survey and subsequent organisation. Under this native malaria assistant is placed a number of sprayers. Some of these are on the staff of the Department and others are voluntary. In this connection it should be stated that some chiefs are not only taking a very keen interest, but also an active part in the work by supplying sprayers. Each sprayer has a certain sector allocated to him, and each sector is divided into six groups of huts corresponding to the working days of the week. Each hut is, therefore, subject to an organised weekly insecticidal spraying, but in practice a large number of kraal heads who have purchased their own pumps spray on an additional day in the week; each group of huts is sprayed on a specific day, and subsequently inspected for adult anophelines. These, if found, are identified by the native malaria assistant and sent to the Government Laboratory for confirmation if necessary. This supervision is the essence of the scheme and absolutely necessary for success. No hut in an area is allowed to be exempted in order to ensure that there are no gaps which may afford anopheline harbourage. If there is any opposition at the outset to hut-spraying on the part of one or more kraal heads, a focal scheme is refused. So strong has public opinion become in this matter that schemes have been successfully initiated even in areas where faith healers had a strong hold on the community, although the ingenuity of the Department's inspectors has been taxed to provide arguments to overcome so-called religious scruples. For instance, the Shembeites object to

interference with disease by medication in any form. They have no objection to shooting buck, however. On objections being raised to hut-spraying on religious grounds, the Department's inspector pointed out that the pump was a species of gun which, when loaded with insecticide, could be used to shoot insects. Objections were then withdrawn. The necessity for having a staff thoroughly conversant with the native mind becomes apparent, and the Department stresses the point that the future European staff working in native areas must be chosen from applicants possessing a knowledge of the people and thoroughly conversant with the native language.

Experience over the past five years in regard to native staff has shown that personality, plus an education not below the Junior Certificate standard is essential. The town-bred native as a rule is useless for work in the reserves. Our training consists of imparting a fairly complete knowledge of the bionomics of the disease and its treatment which is acquired on actual cases at the bedside in a hospital. The surest approach to the kraal native is an ability to treat the disease and especially the complications, such as excessive vomiting. Country schoolmasters have provided the best material. They have not forgotten how to learn, and they make good lecturers and demonstrators.

A less educated class of native has been trained as spotters, and this class is in considerable demand by farmers and smaller local authorities. Sprayers are untrained.

During the past season approximately 18,000 huts have been sprayed once weekly under 34 focal schemes. It may be stated that the places selected for these schemes were in each case known foci where the disease could be expected to break out and from which it has always spread. As a result, the general intensity of fever has been much less in the reserves than last season and, although the focal schemes had been established in what had been the worst areas in the previous seasons, there has been very much less fever where they were being worked than in the less likely area immediately adjoining. An exact parallel was found in the European areas on the coast where serious fever affected barracks where control was slack, whereas there was an almost complete absence of the disease from adjoining estates where anti-larval and insecticide work was effectively done and systematically supervised.

The Department gave anti-larval measures an extensive try-out in the general reserves, apart from Msinga, two years ago and was met everywhere with strenuous opposition mainly on the grounds that oiling of water would poison the cattle. There was even more opposition to Paris Green. To-day we are being asked to permit limited oiling operations. Many natives, having become convinced of the value of insecticidal work, now wish to deal with the mosquito *ab initio*.

Native reserves generally do not lend themselves to anti-larval control owing to the puddle breeding habits of *A. gambiae* and the fact that the Zulu is essentially pastoral and keeps herds of cattle whose hoof-prints provide potential breeding places. Limited anti-larval work, however, and drainage schemes are being promoted where the terrain is advantageous. Slow progress is being made with the institution of permanent measures of control such as tree-planting and re-siting of huts.

Mosquitoes are easily destroyed in the typical Zulu beehive hut which is usually smoke-laden. Smoke does not kill *Anopheles*, although it may drive them down. It is necessary to use an insecticide applied by an efficient spray-pump. "Pyagra", used in a strength of 1 part to 17 parts paraffin, has proved reliable. The cost of material and labour, plus supervision required to give a hut a weekly spraying for a six months' season, works out at 3s. 5d. per hut. The cost of the insecticide is approximately half of this. Accordingly, the expenditure per hut in an area where natives purchase their own pumps and do their own spraying is merely that of the insecticide used. Further, a hut can easily be made mosquito-proof, and natives are keen on putting in a type of door devised by the Department. The cost of these to the native, however, is approximately 8s., and consequently they are not being installed.

At the present time insecticidal control, coupled with a limited amount of anti-larval work, appears to be by far the best suited to natives and the most economical. Huts sprayed during the past season under the supervision of the Department amounted to approximately 30,000.

During the 1932-33 season a trial was made in one reserve of mosquito prophylaxis by means of Plasmoquin, i.e., the giving of a weekly minimum dose of Plasmoquin to each person with the idea of preventing them from becoming parasite carriers capable of infecting mosquitoes. This minimum dosage costs 2s. 4d. per head for the drug alone, and the costs of effective supervision of the prophylaxis were, of necessity, high. The experiment was inconclusive, but was sufficient to show that protection on these lines, in order to be effective, would be costly. It compared unfavourably as an economic measure with the anti-mosquito control previously described which worked out

at approximately 1s. 2d. per head on a controlled kraal population of 10,029 in two coast areas over a period of six months.

Our experience during the past five years points to the desirability of continuing the control measures employed during the past season inasmuch as the cost of such control compares very favourably with that incurred in quinine medication, even if the loss due to sickness and reduced wage earning capacity are altogether disregarded.

There is no system of notification of disease or deaths in the native reserves, and the Department is entirely dependent on home visitation for its figures. Only those relating to deaths are even approximately accurate, but regarding the area south of the Umfolosi the following figures have been compiled:—

Sixty native malaria assistants, working in the worst parts of country amid a native population of approximately one million, examined 247,341 persons of whom 4,509 showed definite first infections of malaria, 13,458 showed enlarged spleens and 26,294 reported that they had had relapses. This is probably an over-statement as all febrile conditions are attributed to malaria. The same applies to deaths of which 882 were reported. Of the foregoing 11,550 of the cases and 516 of the deaths were reported from the inland areas and the remainder from the coastal areas.

The foregoing only applies to the Department's work and staff. A computation of the total personnel employed in Natal on malaria control during the past season may be of interest:—

	Trained.		Untrained (Sprayers).	
	European.	Native.	European.	Native.
(a) Union Health Department.....	7	60	4	80
(b) Municipalities and other Local Bodies (43)	86	10	31	172
(c) Malaria Committees (16).....	24	11	—	95
(d) Voluntary Committees (18).....	—	20	1	27
	117	101	36	374

This does not include those employed by private organisations as sugar estates, wattle growing concerns, etc., whose anti-malarial staffs employed during the season approximate an additional 18 Europeans and 325 Natives.

B. Tzaneen Field Station.—The Malaria Control Station, established by the Department, has again worked in closest co-operation with the Research Station; established by the South African Institute for Medical Research for the purpose of investigating the malaria-carrying mosquitoes of the Transvaal. The Research Unit, having for the time being completed its work in the Transvaal, closed down at Tzaneen on 30th June, 1934, in order to prosecute similar studies in Natal and Zululand. The results of its three years' work in the Transvaal has been published by the South African Institute for Medical Research.

There have been several changes in the staff of the Control Station during the year under review, more particularly with regard to health visitors. Miss Burger resigned on the 30th October, 1933, and her place was taken by Mrs. de Villiers. Miss Martin was transferred to a post in the Department under the Medical Inspector of Maternity and Child-welfare, as from the 30th April, 1934. Her place has been filled by Mrs. Brown. Miss Kuhlmeier resigned on 31st May and the Department is advertising the resulting vacancy.

It is hoped to increase the staff of the health inspectors by appointment of two additional inspectors.

During the past year the inspecting field staff have been operating mainly in the Zoutpansberg and Waterberg districts and in the Koedoesrand, while a number of re-visits have been made to places in the lowveld. The areas mentioned are so vast that it was found impracticable to spread the staff further afield or to do much re-visiting in areas previously visited. Sufficient progress has, however, been made to justify the appointment of two additional inspectors. Without such additional appointments being made it will be impossible to meet the requests for advice and assistance which are being demanded by the public from an ever widening area.

The routine duties of the inspectors are to advise farmers as to the best, most economical and effective measures to adopt to protect themselves and their families from the ravages of malaria, having regard to the special conditions on their particular farms. This can seldom be accomplished at one visit. Usually several visits with practical demonstrations are necessary before a farmer is able to appreciate the importance of what exactly is required of him.

The Medical Inspector (Malaria) during the season travelled 14,798 miles. His duties now are mainly concerned with teaching at public meetings, organisation of the field staff and inspectional visits, such as to the irrigation schemes at Pongola and Rust der Winter. While the field staff operates mainly amongst the rural population, the Medical Inspector (Malaria) has to keep a special watch on local authority areas and supply members of the medical profession practising there with the latest information in regard to malaria as well as to impress upon them the importance of their duties in the prevention of the disease. This applies particularly to the departmental part-time officers, whose work in this connection is producing tangible results with great benefit to the public.

As a result of persistent teaching and individual contact with medical men and the public generally, the importance of diagnosing the disease accurately is becoming more and more obvious. Accurate diagnosis means accurate treatment initiated at the earliest moment. Patients are themselves beginning to insist on blood investigation before treatment is instituted. This has caused an annual increase in the laboratory work carried out at the Control Station since it was established and last year it was found necessary to add a laboratory assistant to the staff of the station.

Malignant tertian is the predominating type of malaria occurring in the Transvaal and benign tertian malaria only occurs infrequently.

The attempt to forecast epidemics is a very important feature of the station. Weekly rainfall data are received here from police posts strategically chosen in the epidemic malaria areas (bushveld regions). These points are often the centres of *gambiae* breeding regions. As this vector is dependent on summer rainfall for its spread, a knowledge of the rainfall in the different areas becomes of great importance and helps in forecasting the spread of *A. gambiae*, and in its wake malaria. Careful graphs have been kept for three seasons and illuminating data have been collected. The graph for instance for the past summer season has, in most areas, been a straight line due to absolute lack of rainfall. Good rains fell during November and December and very little anywhere after this. The consequence was that over the vast bushveld terrain *gambiae* did not spread to any extent from the rivers. Hence malaria has remained endemic along the rivers. This is in striking contrast with conditions in the preceding season, when the stage was set for extensive and wide-spread malaria epidemic conditions at the height of the season (February). Nevertheless, arrangements were made throughout each bushveld magisterial area, to establish posts where quinine was available. The policy in this direction initiated last season was adhered to and even improved upon.

The inspectors were kept operating in the field until the end of May. Since then they have materially helped in the conduct of work of the Research Station. The inspectors have been trained to assist materially in the diagnosis of blood smears and dissection of mosquitoes and they have been indispensable to the various research investigations which have been conducted. In this connection it would be no exaggeration to state that practically all field research data are collected by Department's staff, their evaluation being done by the Entomologist, Dr. de Meillon, who has been in charge of the Research Station. A complete liaison has existed between the two units at Tzaneen.

The health visitors remain constantly in the field where their presence is much needed. Each works through the mother of the home in an attempt to teach and show the advantage of better balanced dietary, and training growing girls to become useful and practical mothers, with regard to sewing, needlework, cooking and the feeding and care of infants.

This is extremely necessary in homes riddled with the effects of malaria. At the same time the health visitor combines with the housewife in urging the man to do his share, namely rendering the house completely mosquito-proof and using larvicides were practicable.

The three health visitors have been placed at strategic points, namely, Mokeetsi, Alldays and Swartwater. Public opinion has been awakened to the usefulness of their services. This is proved by the fact that at Alldays a clinic has been built for the health visitor out of *publicly* subscribed funds. The work of the malaria health visitors has undoubtedly stimulated the demand for the institution of a proper district nursing service which is absolutely necessary, particularly in malarious areas with a population engaged in earning their livelihoods on the land.

The native spotters, four in number, serve a useful purpose accompanying inspectors on long tours with their bicycles, working independently and supplementing the inspectors' findings. In times of epidemic stress these spotters will serve a useful purpose in locating the spread from place to place of *A. gambiae*.

With regard to *new drugs*, the station is unable to test out under controlled conditions the newer preparations that appear on the market from time to time as this can really only be done where hospital facilities are available to enable the tests to be carried out on scientifically controlled lines. Such work, unless controlled, is useless and indeed might be misleading. As to the value of new drugs, we must be guided for the present by the results obtained by reputable workers in other countries. Nevertheless an attempt has been made at the Tzaneen Station to test out Atebrin. This test is still in progress. Atebrin is a definite parasiticide. It acts on the asexual cycle of subtertian and benign tertian—the two forms found in the Union—and the sexual cycle of benign tertian malaria, but it has no effect on gametocytes of subtertian malaria. This has definitely been established locally, and corroborates the parasitological findings of other workers from all parts of the world. Parasites disappear from the peripheral blood about the third to fourth day of observation.

There are now available three specific anti-malaria remedies—quinine and the two synthetic preparations, atebrin and plasmoquin. As the Malaria Commission of the League of Nations points out in its Third General Report, these more recent remedies must not be regarded as being substitutes for quinine, but as additional weapons for use in particular circumstances and for special purposes. Each of the three specific drugs has its own particular action on the malaria parasite at some phase in its life cycle. It is thus bad practice to treat attacks of malaria in the acute stage with a combination of two of the specific drugs, in the hope that one of them may cure the attack and the other prevent relapses. For treating primary attacks of malignant tertian malaria, atebrin has been found much more effective than any other known remedy. Three tablets of 0.1 gram each should be given daily by the mouth for from five to seven days. Up to six tablets can be given on the first day with safety, if desired. Where oral administration is impracticable—as, for instance, with severe vomiting—the drug can be dissolved in normal saline and administered intravenously or intramuscularly.

Relapses continue until the human defensive mechanism has acquired sufficient power to overcome the parasite. For this reason, persons overtreated at the first onset of fever in primary and subsequent attacks, do not acquire sufficient defensive power to prevent relapses. Such cases tend to relapse monthly for a very long period. While it may be unsafe in the primary attack to withhold drugs for a day or two, this can and should be done in the first and any subsequent relapses. Treatment of relapses does not therefore start until after the primary attack. With malignant tertian malaria, the Commission considers that it is justifiable to endeavour to sterilise all the parasites by specific drug therapy during the first recrudescence. Quinine, if not used during the primary attack, should be used for this purpose. If treatment during the first relapse does not prevent further relapses, then treatment of the next relapse should be delayed as long as possible to allow of the physiological defensive mechanism being developed.

The further aim of treatment is to prevent spread of the disease. For this reason the gametocytes, or sexual forms of the malaria parasite, in the human peripheral blood must be destroyed, as they are the only forms which are capable of continuing the life cycle of the parasite in the mosquito. They do not appear in the blood during the incubation period, nor until about ten days after the onset of the first symptoms. Modern work has shown that gametocytes are most numerous in recent cases of malaria. Their appearance is a sign that the patient has not yet acquired an effective defensive power. Gametocyte therapy should therefore only be applied to actual carriers of gametocytes. Quinine and atebrin are apparently incapable of destroying the gametocytes of malignant tertian malaria; plasmoquin, on the other hand, appears to have a direct action on the crescents.

During the year much educative work was carried out. Perhaps the most important of the classes held was the annual class inaugurated by the Transvaal Education Department for school teachers (and others interested). This again proved a great success. A sum of £100 is set aside annually for the purpose of this class. It is regarded as a formal class by the Education Department and the certificates of any teacher attending are endorsed accordingly after the successful passing of a written and oral examination.

Addresses were given to various farmers' associations in the course of routine work. Some of these now propose to buy larvicides and insecticides in bulk for the use of their members. This will reduce the cost to the consumer. At present the rural population is entirely dependent on the small country stores where prices are often excessive.

As already pointed out the research work carried out at Tzaneen has been crystallised in a paper by the Entomologist of the Research Station, the title being "Observations on *A. gambiae* and *A. funestus* in the Transvaal". This work has been rendered possible by the two stations functioning as a unit.

It would appear to be worth while summarizing the more important facts which have been demonstrated:—

- (a) From indirect evidence it has been found that the mosquito vector population diminishes considerably with distance; only about 20 per cent. are found beyond the half-mile radius. What danger this 20 per cent. may cause can only be assessed at a given moment and locally, with particular reference to the infectivity index; for instance at Pongola it was found that while few mosquitoes were entering habitations with anti-larval operations extending to a half-mile, these few were reduced to none when intelligent effective anti-larval work was carried to three-quarters of a mile.
- (b) The most dangerous place to contract malaria in any malarious area is the house, particularly the sleeping quarters. This does not imply that there is absolutely no risk of contracting the disease outside. The risk in the house is 95 per cent. and outside 5 per cent. Upon this fact is based all our anti-adult measures.
- (c) Although the limits of the vector breeding grounds have not been actually demarcated, a great deal has been achieved from a study of the meteorology of the country. Thus it has been established that *A. gambiae* spreads only with rainfall. Breeding continues during the winter in regions where frost is lacking. Owing to its close relationship to rainfall its spread may, therefore, be intra-seasonal, seasonal or annual. The factors determining the breeding of *A. funestus* are, a mean monthly temperature of 61° F. or over, a diurnal range of temperature of less than 40° F., and an annual rainfall of 30 inches or over (less where the area is immediately adjacent to an area with higher rainfall). With heavy rainfall breeding of this mosquito may actually diminish due to flooding and flushing of rivers.
- (d) Observations were carried out on various culicifuges (repellents). Most of those on the market are good. They all contain citronella oil, which is the culicifuge. Their effectiveness is of short duration; this must be borne in mind as several applications at night are necessary for safety.

The work of the station is being appreciated in Northern Transvaal, and there is abundant evidence that the teaching of the station is actually being practised in many homes. This teaching can be very briefly summarised as follows:—

PREVENTION.

(A) <i>Funestus</i> Areas.....	1. <i>Anti-adult</i> : By screening, bednets, insecticides, and repellent smears.
(Largely bushveld)....	2. <i>Anti-larval</i> : By oiling and keeping down the vegetation along the banks of streams.
(B) <i>Gambiae</i> Areas.....	1. <i>Anti-larval</i> : Temporary (oiling) or permanent work on exposed puddles, pools, etc.
(Largely bushveld)....	2. <i>Anti-adult</i> : By screening, bednets, insecticides, and repellent smears.

It is not at all difficult or cumbersome to carry out these various measures once the machinery and methods are established.

It will be noted that in a *funestus* area, anti-adult measures are placed first in order of importance, and in a *gambiae* area anti-larval measures; but, undoubtedly, the best results are obtainable where a combination of all the measures are equally stressed and put into operation with equal force in any given area. This is not always financially possible. The only places where it has been successfully carried out are on the Pongola Irrigation Works and at many railway stations. It is also being done in several homes in the lowveld and on many farms in the bushveld. Such places will in time shine out as examples to their neighbours. Where these measures have been scrupulously and methodically adhered to, success has been the result as indicated by the absence of malaria. There are, however, also places where anti-adult measures in a *funestus* area together with very little anti-larval work have been completely successful, and in a *gambiae* area where anti-larval measures with very little anti-adult measures have succeeded.

These measures were advocated in the last Annual Report of the Department. They have now been put into effect for another season and there appears to be no reason to depart from or improve on them.

As pointed out elsewhere a very important duty of the Medical Inspector is to urge medical men to adopt preventive measures. Their rôle is a very important one. Last year he and the Railway Health Officer toured the Union malaria areas with this object in view. A mode of treatment was

discussed and officially adopted by the South African Railways Administration. Many hospitals and medical officers to private enterprises throughout the malaria areas have, with success, adopted this treatment. The whole aim is to treat so efficiently that relapses are brought down to a negligible quantity. There exists to-day a happy relationship between this station and the medical profession.

C. *Orange and Kuruman River Areas*.—Heavy rains fell in most parts of the country during November, December and January, with the result that the larger rivers soon became flooded in their lower reaches. This is what obtained along the lower portion of the Orange River owing to unprecedented rains in its huge catchment area.

Early in February the Department issued warnings to magistrates and local authorities of the areas likely to be affected by the floods. These warnings set out the dangers to the health of their populations resultant upon floods. The ordinary every-day machinery of their activities would be likely to be disorganised. Amongst these the sanitary services would be likely to breakdown with consequential detrimental results, such as fly-breeding, with its sequelae of filth-born diseases. As the floods subside abundant standing water would be likely to be left behind in the form of large sheets of water down to small pools and puddles. Conditions for increased mosquito breeding would be likely to become very favourable and the risk of malaria increased.

This was exactly what did happen in the month of May along the Orange River from a point above the Buchberg Dam right down to its mouth.

The Tzaneen station at an early stage (February) got into contact with the District Surgeon, Kakamas, who had received his malaria training at the station. He was asked to forward for identification larvae from the well-known and dangerous breeding grounds of *A. gambiae*.

As there are many Anopheline puddle-breeders besides *A. gambiae* it became necessary to determine, in the first place, whether or not *A. gambiae* was increasing in numbers before further action became necessary. Batches of larvae for identification were received from these areas from time to time right through March and the beginning of April. There appeared to be from these collections a considerable amount of breeding of one species only, viz. *A. listeri*. This species was not only breeding profusely over a wide area, but the adults were also feeding on human beings and being caught in houses. Up to this point, however, there was no incidence of malaria anywhere. It was realised though that *A. gambiae* might be breeding in very small numbers, and that we knew nothing about the malaria carrying propensities of *A. listeri*. It was, therefore, deemed necessary to send a trained malaria inspector to the scene. Subsequent events proved the advisability of this precaution.

The inspector arrived at Upington about the middle of April. *A. gambiae* amongst a profusion of *A. listeri* was found breeding in the area of the Upington Municipality. At Kakamas further down the river, from where most of the larvae had been sent for identification, *listeri* were also breeding in very great numbers. Owing, however, to the persistence and tenacity of the inspector, *gambiae* were found; in one collection there were 256 *listeri* and 1 *gambiae*. It might reasonably be inferred then that *A. gambiae* was just commencing to increase in numbers in these areas about the middle of April. No malaria had yet occurred. Events now, however, moved quickly. *A. gambiae* commenced to be found in houses and, within a few weeks, malaria commenced.

When the inspector arrived on the scene the stage was set for the propagation of malaria. Advice was immediately given to the local authorities concerned and Government Departments, particularly Lands and Irrigation, for combating the adult mosquitoes. Insecticides were being freely used in the homes. Lecture demonstrations were next given throughout the area from Buchberg downwards to Kakamas including the Dutch Reformed Church Island Settlements. Everywhere there was active co-operation and all commenced participating in the fight against the adult mosquitoes. At the same time steps were taken to obtain larvicides, and no time was lost in minimising the breeding of the vector in pools, puddles and seepages. The malaria sickness rate increased in May and began to spread to the adjoining rural areas where the total number of cases observed rose to large proportions. Death overtook many in these areas as the warnings issued had not been received in isolated areas or, if received, had fallen on deaf ears. Malaria in these parts had not been known to assume epidemic proportions since 1925, and previous to that, 1906.

There can be no doubt that the measures instituted and carried out in areas where local control was able to be instituted were successful up to a point. The ravages of the disease were largely felt in the outside rural areas difficult of control, where, owing to distance, medical aid was often obtained too late.

Quinine supplies throughout were plentiful, and the inspector arranged for the strategic distribution of this drug. He also paid a visit to Kuruman. Malaria was not prevalent there but there was a mild epidemic in the district. The area under control of the Divisional Council was organised along the same lines as those adopted in the areas adjoining the Orange River. Adequate stocks of quinine for treating the sick were laid in, and anti-adult measures followed by anti-larval measures instituted.

The scattered and isolated rural population of these districts suffered most. There it was quite impossible to institute measures sufficiently rapid to have any effect on the course of the disease.

During June, the District Surgeon, Upington, reported that in his area there were approximately 1,200 cases, including many relapses. Towards the end of this month the spread of the disease began to peter out, owing, no doubt, to the great diminution in the breeding of the vector *A. gambiae*.

To summarize, an epidemic of malaria occurred along the lower reaches of the Orange River, from Buchberg Dam downwards, including Upington, the islands below Upington, Kakamas, Kuruman and the Irrigation Scheme at Violsdrift, and the whole adjoining country with its scattered rural population. *A. gambiae* occurs to some extent in these areas at all times. Only at certain periods, no doubt due to favourable meteorology, does breeding increase to such an extent as to cause epidemic spread. The parasite reservoir among human beings is also usually low. We know from medical evidence that malaria does occur from season to season in these areas. It therefore merely required favourable conditions of meteorology to cause a widespread and death-dealing epidemic of the disease. Where measures were carried out, the incidence and spread of the disease were low in comparison with what occurred in districts where precautions were not taken. We have learnt also that *A. listeri* although entering houses and feeding on human blood has little or nothing to do with the transmission of malaria. Malaria only commenced to spread when *A. gambiae* made its appearance in sufficient numbers.

D. *Pongola Irrigation Works*.—The Upper Pongola Scheme which is expected to be completed in September, 1934, has been developed by the Irrigation Department for land settlement purposes. The area to be irrigated lies to the west of the "Rooi Rand" in the vicinity of the old Candover Cotton Estates. The whole of this region is intensely malarious; nevertheless the work was successfully carried on throughout two malaria seasons.

This is the first occasion where the State has set out to control malaria on a large scale using every practicable preventive measure. Of great value is the fact that it has been clearly proved that given staff trained in the prevention of malaria the disease can be controlled in such an area at very little cost. The sum of money actually expended on malaria prevention in this scheme was only about 1 per cent. of the total cost of the works. This compares very favourably with organisations of this nature elsewhere in the world for combating the disease. That the control measures adopted were to a very great extent successful is indicated by the fact that the percentage of new infections amongst the native employees of whom an average of 3,800 were continually employed over the whole period, was 0.12 per cent., while the relapse rate was roughly 4 per cent. Similar data for the Europeans, average strength 500, revealed a 1.5 per cent. new infection rate and a 4.9 per cent. relapse rate.

These results are so striking that full details appear to be worthy of record. These are published as an annexure (Annexure D). There is no reason why the satisfactory conditions should not be maintained when actual settlement on the area to be irrigated occurs.

Such a settlement in a malaria area can only be successful if the agricultural aspect is made subservient to the health demands. In other words, very careful consideration will have to be given to the control of malaria which may necessitate radical changes in the organisation of Agricultural settlements as arranged hitherto in areas outside the sub-tropical regions of the Union.

E. *Railway Areas*.—The importance of malaria along railways in those parts of the Union where this disease occurs warranted the appointment two years ago of a full-time medical officer devoting practically the whole of his time to the combating of this disease. This appointment was made on the recommendation of Professor Swellengrebel who advised the Government as to its malaria policy. Dr. Booker—the officer appointed—has been made an Assistant Health Officer and has been seconded to the Railway Administration.

The report of this officer is published in full as Annexure E to this report.

6. *Plague*.—Considering that plague is now enzootic among the veld rodents over more than half the Union the number of human cases reported during recent years is reassuringly small, and indicates that the position is

being kept reasonably under control. As has been repeatedly pointed out, our efforts are greatly assisted by the habits of the chief rodent vector in the Union. The gerbille is very shy of human beings and will not normally enter their habitations being entirely a veld dweller. Our domestic rodents which are the chief danger to man have for the past two decades escaped plague almost entirely.

Meanwhile the general public has become increasingly alive to the danger and anti-rodent measures are being more and more adopted in buildings. Nevertheless much yet remains to be done before our towns and villages can be regarded as entirely safe from the risk of a plague epidemic. This can only be when all buildings, more particularly those which house grain and other food of rodents, are constructed on rodent-proof principles. The extra cost of making buildings rodent-proof is not great and is usually fully compensated for by the subsequent protection against the destruction wrought by rodents. The Department has therefore continued to urge local authorities to enforce the rodent-proofing regulations in their areas in the case both of new buildings and existing buildings. In the absence of human cases in the area it is difficult to maintain interest in this matter. The very paucity of cases therefore constitutes a danger, since local authorities are liable to be lulled into a false sense of security.

Rodent officers in the Free State report that veld rodents are again multiplying rapidly. This is a serious matter for that province. Unless the farming community co-operate actively in anti-rodent measures a severe plague epizootic is almost unavoidable and is likely to result in numerous cases of human plague.

In the Cape Province a very serious position has arisen owing to the fact that infection in rodents has crossed the Oliphants River and the geographic barrier hitherto afforded by the Cedarberg Mountains, and has travelled southwards to a point in close proximity to the village of Leipoldtsville. Plague rodent infection has thus for the first time reached to or actually entered the grain area of the south-west Cape. The measures for protecting the Cape Peninsula have therefore been greatly strengthened by the Government. The expenditure in connection with the maintenance of rodent-free belts has been doubled, four anti-rodent gangs being now engaged on this work.

In the Worcester area infection among rodents is also advancing steadily. It is gratifying to be able to record that the Worcester Municipality has now taken definite anti-rodent measures to deal with both field and domestic rodents.

The human outbreaks and cases which occurred during the year are tabulated in table "H".

TABLE H.—PLAGUE CASES AND DEATHS IN THE UNION DURING THE YEAR ENDED 30TH JUNE, 1934.

Province.	Number of Districts in which Outbreaks Occurred.	European.		Coloured or Native.		Total.	
		Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cape.....	2	—	—	16	12	16	12
Natal.....	—	—	—	—	—	—	—
Transvaal.....	1	—	—	1	1	1	1
Orange Free State.....	6	2	2	20	14	22	16
UNION.....	9	2	2	37	27	39	29

The outbreaks were confined almost entirely to the Orange Free State and the adjoining districts of Klerksdorp in the north and Aliwal North on the south. The only district remote from the Orange Free State which was affected was Uitenhage in the Cape.

7. *Rabies*.—During the year rabies infection was found as the result of *post-mortem* examination to have been present in 6 mongoose, 3 domestic cats, 1 wild (genet) cat, 2 sheep, 1 calf, and 3 human beings (1 native male and two European females). The total number of human deaths known to have been due to rabies since 1916 is now 32. The biting animals responsible for these human deaths were as follows:—

Mongoose	16
Dog	8
Genet Cat	4
Domestic Cat	2
Skunk	2

The most dangerous animal in the Union with regard to rabies is the yellow mongoose (*Cynictus penicillata*). In addition to the human deaths listed above it is known to have caused deaths from rabies of cattle and dogs.

When in the acute stages of rabies it will snap at cattle drawn to it by curiosity, at dogs hunting it, and persons, especially small boys, who give chase to it when it has obvious difficulty in escaping. A mongoose which is sick, as evidenced by its difficulty or unwillingness to escape when approached, must be looked upon as one of the most dangerous creatures in South Africa, considerably more so than most snakes. The importance of this fact cannot be stressed too frequently. Hardly a year now goes by without these very terrible deaths being recorded. One of the European females mentioned above was bitten by a mongoose last March on the left middle finger. She developed rabies a fortnight later and died.

Other sick animals such as domestic dogs and cats with signs of madness are also to be avoided. They may have got their infection from the wild carnivores. But should a person inadvertently be bitten by a sick or mad animal, suitable preventive measures may yet be taken. The wound is cauterized and cleansed. The biting animal should if possible not be killed. If it is still alive after ten days it can be assumed with absolute certainty that it was not rabid at the time of biting, since the disease in man and animals is invariably fatal a few days after the first symptoms appear. If the animal is killed or dies, the carcase, if a small one, should be packed in ice and sent to the Onderstepoort Laboratory for examination. If the carcase is a large one the head and neck only should be sent. Vaccine treatment must be commenced as soon as possible. If the biting animal survives or is shown by *post-mortem* examination not to have been suffering from rabies, vaccine treatment if commenced may be discontinued. This vaccine which is prepared in this Department's laboratory at Capetown (telegraphic address, "Health, Capetown"), is kept in stock there and at the South African Institute for Medical Research, Johannesburg (telegraphic address "Bacteria, Johannesburg"). It is supplied gratis to practitioners.

Where a human death suspected to be due to rabies occurs, a *post-mortem* examination should be made with the least possible delay. The skull should be opened with special care, the brain removed and packed in ice, and sent by the most expeditious means to one of the Government Health Laboratories or to the South African Institute for Medical Research.

8. *Smallpox*.—Smallpox continues to be of relatively insignificant importance in the Union, but an alert policy is nevertheless adopted with regard to this disease which if it were not for extensive vaccination of the population might easily assume formidable epidemic proportions. Thirteen small outbreaks in all were reported accounting for 29 cases, only one of which was fatal. These are set out in Table "J".

TABLE J.—SMALLPOX: CASES AND DEATHS REPORTED DURING THE YEAR ENDED 30TH JUNE, 1934.

Province.	Number of Districts in which Outbreaks Occurred.	European.		Non-European.		Total.	
		Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cape.....	5	5	—	6	—	11	—
Natal.....	1	—	—	1	—	1	—
Orange Free State.....	4	—	—	8	1	8	1
Transvaal.....	3	—	—	9	—	9	—
UNION.....	13	5	—	24	1	29	1

The active enforcement of legislation in regard to vaccination has been continued. Tables summarizing the position will be found in Annexure "F".

9. *Tuberculosis*.—The urgent need for a more active campaign against the rapid spread of tuberculosis throughout the Union was set out in detail in the last annual report of this Department. This disease continues to be one of the gravest public health problems we have to face. It must be tackled by improving the environment as well as by treating and dealing with the disease in a rational manner. It has been shown that most of the large towns has to face the question of the elimination of slums. Except in a few towns the disease itself has not been dealt with comprehensively and the time has now certainly arrived when further action is essential.

The cases notified during the year are set out in Table K (i). Altogether 7,663 were notified, an increase of 752 over the previous year, of 1,214 over the year before and of 1,515 over the year ended June, 1931. A small portion of this increase may be due to better notification resulting from improvement in diagnosis. But I think that the bulk of it probably represents a definite increase in the incidence of the disease, possibly due in

a large measure to a delayed action of the economic depression with its evil effect on the food and housing conditions of the poorest classes of the community.

TABLE K (i).—TUBERCULOSIS: NOTIFICATIONS DURING THE YEAR ENDED 30TH JUNE, 1934.

	European.	Non-European.	Total.
Cape (excluding Transkei).....	466	3,554	4,020
Transkei.....	—	1,017	1,017
Transvaal.....	150	1,291	1,441
Natal.....	125	837	962
Orange Free State.....	22	201	223
UNION.....	763	6,900	7,663

The death-rate from tuberculosis among Europeans in the Union is estimated at 42·3 per 100,000 of the population, i.e., about one-half of that of England and Wales. During the past two decades the Government of the latter countries has, by the institution of suitable measures, reduced their death-rate from tuberculosis by one-half; the Union, which has not properly grappled with the problem, has reduced it by less than one-third. In the coastal regions of the Cape and Natal, the European death-rate from this disease, in spite of our much greater share of sunshine, is approximately equal to that of England and Wales. Owing to the almost complete absence of vital statistics regarding our Native population the death-rate among them is impossible of assessment, and the difficulty in assessing the position once more strikingly illustrates the necessity from a public health point of view of securing a proper system of vital statistics amongst non-Europeans. At the Cape, however, the death-rate among non-Europeans from tuberculosis is estimated to be six-and-a-half times greater than among Europeans in that area, or 13 times greater than the general death-rate among Europeans from tuberculosis in the Union. The Asiatic rate in Natal is 4 times that of the Union rate for Europeans. In the coastal areas generally it is believed that the incidence of the disease among non-Europeans is steadily increasing. The death-rate among Europeans in the Union during the past 20 years in the four provinces is shown in Table K (ii).

TABLE K (ii).—DEATH RATES FROM TUBERCULOSIS PER 100,000 OF POPULATION—EUROPEANS ONLY.

Year.	CAPE.			NATAL.			TRANSVAAL.			ORANGE FREE STATE.			UNION.		
	M.	F.	P.	M.	F.	P.	M.	F.	P.	M.	F.	P.	M.	F.	P.
	1912.....	70.55	44.83	58.11	85.84	62.66	75.03	55.97	26.97	43.14	29.58	28.09	28.89	61.10	38.32	50.49
1913.....	70.19	53.93	62.31	81.15	52.19	67.60	57.61	22.43	41.88	29.54	24.13	27.02	61.21	39.67	51.13
1914.....	60.82	40.27	50.85	83.59	32.85	59.80	57.60	25.42	43.08	28.44	14.31	21.81	57.26	31.39	45.10
1915.....	56.42	40.43	48.64	69.37	33.52	52.52	60.69	21.73	42.95	19.98	25.92	22.78	54.26	31.76	43.63
1916.....	42.31	44.91	43.58	75.22	35.95	56.72	72.37	33.91	54.71	27.30	16.30	21.99	53.91	36.77	45.78
1917.....	64.12	51.27	57.53	66.75	38.21	53.28	70.23	22.42	48.09	37.75	16.12	27.44	63.18	35.55	50.02
1918.....	52.07	39.25	45.81	64.87	46.97	56.39	76.62	21.28	50.80	37.65	18.20	28.33	60.24	31.06	46.28
1919.....	41.56	49.23	45.32	57.63	30.66	44.73	82.21	13.39	49.82	43.60	12.37	28.61	57.95	30.55	44.77
1920.....	52.55	39.07	45.94	73.70	43.50	59.14	72.91	19.73	47.70	45.30	17.79	32.08	60.92	30.07	46.00
1921.....	36.99	64.06	60.48	74.93	24.00	50.21	102.08	22.70	64.22	54.13	23.12	39.20	74.65	40.87	58.26
1922.....	61.70	55.91	58.84	35.64	11.54	23.90	75.78	22.41	50.24	20.07	19.52	19.81	59.27	35.56	47.74
1923.....	55.03	52.43	53.74	41.62	40.45	41.05	74.45	21.12	48.77	19.91	17.17	18.59	56.53	35.91	46.46
1924.....	67.04	52.82	60.00	50.93	36.38	43.77	84.54	23.41	55.01	14.71	22.25	18.33	65.47	37.08	51.59
1925.....	65.65	62.14	63.91	73.89	40.51	57.42	74.27	21.84	48.87	30.01	12.59	21.65	65.19	39.68	52.70
1926.....	58.97	57.36	58.18	49.23	39.85	44.64	95.54	24.41	61.09	24.89	16.22	20.68	67.29	38.90	53.41
1927.....	61.36	59.87	60.62	71.95	28.73	50.78	78.78	17.87	49.20	24.58	12.98	18.94	64.30	36.10	50.50
1928.....	60.72	56.51	58.64	54.99	25.55	40.56	85.08	20.74	53.75	31.76	15.74	23.96	65.61	35.69	50.95
1929.....	57.98	51.63	54.85	44.58	22.56	33.78	72.48	18.08	45.95	22.16	17.47	19.87	57.70	32.54	45.37
1930.....	62.20	50.58	56.46	51.74	31.51	41.81	73.84	18.96	47.09	23.47	6.87	15.36	61.05	31.96	46.78
1931.....	55.79	55.75	55.77	54.26	26.34	40.54	64.26	15.05	40.33	24.81	11.92	18.49	55.41	32.62	44.22
1932.....	51.02	54.55	52.77	58.63	24.66	41.92	59.19	16.40	38.37	20.02	15.83	17.96	51.49	32.84	42.33

Prior to 1921 certified deaths only were included.

M. = Males; F. = Females; P. = Persons.

The problem was considered at the January session of the Council of Public Health which passed the following resolution:—

“ This Council views with alarm the incidence of tuberculosis in the Union among Europeans and Coloured people and the unsatisfactory and inadequate manner in which the problem except at a few centres is being dealt with at present, as disclosed by the annual report of the Public Health Department.

The Council realises that drastic steps are necessary to cope with the present position and believes that the time is now opportune to enlist the sympathy of local authorities and the public generally with a view to the betterment of the housing conditions of the poorer classes and the provision of more adequate facilities for the care of those suffering from the disease.

The Council is satisfied that the aims of the Public Health Department to secure a national scheme for dealing with tuberculosis embracing—

- (1) tuberculosis clinics in all the larger centres subsidized under the Public Health Act;
- (2) the enlargement of the existing sanatorium so as to serve the whole Union, for the care and treatment of early and curable cases; and
- (3) provision for the hospitalization of advanced cases in each of the four provinces,

are worthy of the earnest consideration of the Government and recommends accordingly.”

A national scheme has now been formulated for dealing with tuberculosis, embracing clinics in all the larger centres subsidized under the Public Health Act, the enlargement of Nelspoort Sanatorium, and better provision for the hospitalization in all four Provinces of cases requiring Institutional treatment. As it is anticipated that at least the larger municipalities will be prepared to fall in with this national scheme the sum available as refunds to local authorities in connection with expenditure on tuberculosis has been increased for the year 1934-35 from £11,500 to £14,500. Provision has been made for the building in Natal of a Tuberculosis hospital for all classes of the community at a cost of £60,000. The Tuberculosis hospital at Springkell near Johannesburg which has hitherto been used chiefly for miners phthisis patients was made available as from the 1st April, 1934, for cases of tuberculosis from local authority areas. Fifty beds have been set aside for such cases, female as well as male. These beds will be used chiefly for advanced chronic patients; but they will also be useful for cases under observation as to their suitability for sanatorium treatment at Nelspoort, and also for cases known to be suitable for such treatment but for whom beds at Nelspoort are not yet vacant. The accommodation at Nelspoort Sanatorium is being increased. As a first instalment the Government proposes to add another 30 beds during the current year bringing the total number of beds there to 138. Lastly hospital wards for chronic and acute non-European tuberculosis patients are being added to the Infectious Diseases Hospital at Rietfontein near Johannesburg at a cost of approximately £20,000.

The measures outlined will, it is expected, bring great relief to the unfortunate sufferers, and will also lessen to a considerable extent the menace of tuberculosis in the Union by removing highly infective persons from overcrowded or unsuitable dwellings. At the sanatorium tractable cases have an opportunity of the disease being cured or arrested and patients are trained in habits which will minimise the possibility of recurrence and prevent them from being a danger to other people.

It is possible that at a later stage these measures will have to be supplemented by something in the nature of a convalescent work colony for suitable cases.

It is recognised by the Department that the financial provisions of the Public Health Act are unsuitable and that many of the local authorities in the Union are too weak financially to be able to carry out their duty in regard to Tuberculosis. It is obvious that an amendment of the law broadening the financial burden is required but as this matter has been specially brought to the notice of the Provincial Finance Commission it is anticipated that the matter will be dealt with and proposals made in the Report of the Commission in due course.

Nelspoort Sanatorium has continued to do very valuable work. Three classes of patients are admitted:—

- (1) *Free Patients*.—Half the cost of treatment is paid by the local authority, and half by the Department of Public Health.

- (2) *Part-paying Patients*.—In this case the patient pays a contribution towards the cost of his treatment, the balance being paid in equal shares by the local authority and the Department of Public Health.

In these two classes of patient, application for admission must be submitted by the local authority, which guarantees payment of the agreed amount in each case. The tariff per patient per day is fixed periodically by the Treasury on the advice of the Advisory Committee—representing the Cape local authorities, the Trustees of the late Mr. Garlick, and the Government.

- (3) *Full-paying Patients*.—The institution was not intended for full-paying patients, but as in the early years the other classes of patients did not take up all the beds, and as applications were received from people willing to pay the full rates, such patients were admitted at a tariff of 12s. 6d. a day.

The following table summarizes the work of the institution during the year:—

TABLE K (iii).—ADMISSIONS, DISCHARGES AND DEATHS DURING THE YEAR ENDED 30TH JUNE, 1934.

	Total.	European.			Non-European.		
		Male.	Female.	Total.	Male.	Female.	Total.
In Sanatorium on 1st July, 1933	95	28	33	61	18	16	34
Admitted during year.....	274	97	87	184	52	38	90
TOTAL.....	369	125	120	245	70	54	124
Died during year.....	7	2	3	5	2	—	2
Discharged during year.....	266	94	85	179	51	36	87
TOTAL.....	273	96	88	184	53	36	89
In Sanatorium on 30th June, 1934	96	29	32	61	17	18	35

The patients admitted during the year were in the following stages of the disease:—

Race.	Stage I.	Stage II.	Stage III.
European	20·1 per cent.	45·1 per cent.	34·8 per cent.
Non-European	14·5 per cent.	53·3 per cent.	32·2 per cent.

Of the 274 admissions during the year, 248 were free, half their cost being paid by the local authority and half from the Department's Vote, 14 were part-paying or contributing and 12 were full-paying patients.

The average stay of patients in the institution was: Europeans, 119 days; Non-Europeans, 125 days.

Of the 266 patients discharged, 124 were noted as "much improved", 115 as "improved", 24 as "stationary", and 3 as "worse".

The incidence of tuberculosis among prisoners, was carefully investigated as there appeared to be considerable probability that the spread of the disease is being promoted by gaol conditions. The number of prisoners suffering from tuberculosis who were in prison institutions during the calendar year 1933 was 212, distributed as follows:—

Cape	109
Natal	66
Transvaal	28
Orange Free State	9

The Pietermaritzburg Gaol, which was supposed to provide accommodation for tubercular prisoners, was found on inspection to be most unsuitable. The accommodation consisted of an antiquated and sunless shed with open sides in the middle of the cramped gaol yard.

If the tuberculosis problem is to be properly tackled it will be necessary to centralise cases among prisoners in suitably constructed institutions, in which manual labour involving the lifting of heavy weights, even occasionally, would be precluded and replaced by light manual labour performed out of doors or in the open air sheds; special diet would also be required. This Department is pressing for such measures.

Bovine tuberculosis which is largely responsible for the non-pulmonary form of the disease in man is receiving much attention from the veterinary authorities of the Department of Agriculture, particularly in connection with milk supplies as has been described in previous reports. The Congress of the Medical Association of South Africa, held in Capetown in September, 1933, passed a resolution:—

“ That it is desirable that research be undertaken in the different centres of the Union to ascertain the relative incidence of bovine and human tuberculosis amongst the population.”

This motion was submitted to the January session of the Council of Public Health. The views of the Director of the S.A. Institute for Medical Research had already been sought. He had expressed himself in agreement with the view that it was desirable that further research on the matter should be undertaken; his institution could carry it out with the co-operation of the government laboratories and clinicians willing to assist in obtaining suitable specimens. The Council agreed that the resolution of the Medical Congress be accepted in principle; that the work should be undertaken by the S.A. Institute for Medical Research; and that arrangements should be made for procuring material from Capetown, Durban and Port Elizabeth.

10. *Typhus Fever*.—The continued state of extreme poverty over the areas occupied chiefly by Natives has made itself felt by a further great increase in the incidence of typhus fever. Poverty results in overcrowding, lack of facilities for cleanliness of body and raiment and, therefore, almost unavoidable lousiness.

Where the natives are poorest they are most lousy. Under these conditions a louse-borne infection must necessarily spread rapidly.

The notifications of typhus fever cannot under present conditions be expected to indicate anything like the full extent of infection. It is probable that the great bulk of cases go un-notified. Nevertheless the number notified in any one year can usefully be compared with the numbers notified in other years to arrive at the relative incidence. The notifications during the recent years have been as follows (for years ended 30th June):—

1925	...	...	...	...	...	...	...	...	...	1,144
1926	...	...	...	...	...	...	...	...	...	1,135
1927	...	...	...	...	...	...	...	...	...	895
1928	...	...	...	...	...	...	...	...	...	1,331
1929	...	...	...	...	...	...	...	...	...	1,480
1930	...	...	...	...	...	...	...	...	...	1,782
1931	...	...	...	...	...	...	...	...	...	1,541
1932	...	...	...	...	...	...	...	...	...	1,550
1933	...	...	...	...	...	...	...	...	...	2,125
1934	...	...	...	...	...	...	...	...	...	5,956

It is striking that the notifications during the year just ended were more than twice as numerous as during any other year in the past decade. Curiously enough the increase has been only slight in the Cape Native Areas. This is not to be interpreted as indicating that the natives there have not suffered economically. That typhus is relatively quiet among them is most probably due to the fact that the population has become immunised to a very considerable extent during the life of the present generation. For the past 30 years or more typhus has been very prevalent in the Transkei. The survivors cease to be susceptible to infection, and the population as a whole is therefore in a better position to withstand infection during the period of economic stress than populations that have not so suffered in the past.

The most striking increase has occurred in the Orange Free State where outbreaks occurred in 30 districts and a total of 3,636 cases with 300 deaths were reported, as contrasted with only 14 affected districts, 242 cases and 35 deaths the previous year. The reason for this excessive prevalence in the Free State is threefold. In the first place this province had for a very long time been relatively free from typhus infection. The native population has not therefore been salted against the disease to any extent. Secondly the pauperisation process has been very intensive here for several years so that the stage was prepared for a rapid spread of the infection when introduced. Thirdly the infection was abundantly introduced throughout the year from Basutoland. Natives suffering from the effects of extreme poverty, badly infested with lice have been streaming over the border from Basutoland to look for work in the Free State. Typhus is apparently rife in Basutoland since many of these Basutos brought infection with them and lit up the disease in the various districts to which they travelled.

Preventive measures have been urged among all of the threatened population. These measures consist of deverminisation of the bodies and clothing or blankets of the louse-infested natives.

All available inspectors have been stationed in the districts along the Basutoland border and additional temporary deverminizers have been

engaged. These officers have not only instructed local authorities, farmers and others in the methods of deverminisation, but have themselves carried out deverminisation of louse-infested natives on a very large scale.

The measures adopted are those which are fully described in the Departmental pamphlet on typhus. This pamphlet has been freely distributed.

TABLE L.—TYPHUS FEVER: CASES AND DEATHS REPORTED DURING THE YEAR ENDED 30TH JUNE, 1934.

Province.	Number of Districts in which Outbreaks Occurred.	European.		Non-European.		Total.	
		Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cape.....	56	23	—	1,882	259	1,905	259
Natal.....	12	10	—	197	65	207	65
Orange Free State.....	30	12	3	3,624	297	3,636	300
Transvaal.....	7	—	—	208	38	208	38
UNION.....	105	45	3	5,911	659	5,956	662

In Table "L" the typhus cases that were reported during the year are set out according to the provinces in which they occurred. It will be observed that 45 European cases occurred. These serve as a reminder of the risks run by having a large reservoir of infection in our midst. A single infective louse may cause the disease. Houseboys may have recently arrived from an infected kraal or they may be visited by relations recently arrived from there. Three of the European patients in the Free State died under tragic circumstances. One of them was a particular valuable officer of this Department, the District Surgeon of Wepener.

11. *Venereal Diseases*.—The following Table summarizes the work done during the year in connection with venereal diseases by district surgeons, local authorities, and institutions:—

These diseases continue to be distressingly prevalent. Local authorities are encouraged to institute and maintain clinics for treatment and prevention purposes. The necessary drugs are supplied free of charge to such clinics and also to district surgeons. Further, two-thirds of the approved net cost of recognised clinics is refunded by the Department. Many local authorities have already availed themselves of these facilities, but there are still a large number that have as yet taken no steps to combat this social evil.

To allow of more active promotion and supervision generally of anti-venereal disease activities it is recommended that in the near future the Department should be strengthened by the appointment of an additional Assistant Health Officer specially trained in this aspect of preventive medicine and it is considered also that the authorities in charge of Mission Hospitals throughout the Union who are willing to undertake the treatment of non-European cases should be requested to assist actively in the campaign and should be enabled to draw on the Department for the supply of approved remedies free of charge. At present the provisions of the law prevent this being done owing to the fact that most Mission Hospitals are not usually regarded as public hospitals and because not being subsidised from public funds a small charge for the treatment of patients has necessarily to be made for the upkeep of the hospitals.

VI.—GENERAL.

1. *Housing*.—Full details of the working of the Housing Act, No. 35 of 1920, from the date of its commencement are given in the report of the Central Housing Board for the calendar year 1933 which was laid in typescript on the Tables of Parliament. A summary of the position as at 30th June, 1934, is given in the following table:—

TABLE N.—HOUSING ACT No. 35 OF 1920: WORKING FROM PROMULGATION (16TH AUGUST, 1920), TO 30TH JUNE, 1934.

Province.	Loan Applications Approved.			Loan Issues.	Number of Houses														
	European.	Non-European.	Total.		Completed.	Under construction.	Approved, but not yet commenced.	Total.	Total for European occupation.	Total for non-European occupation.									
	£	£	£																
(A) <i>Economic Housing.</i>				£															
Cape.....	1,265,587	645,505	1,911,092	1,829,547	6,488	95	307	6,890	2,065 (a)	4,825 (b)									
Natal.....	542,719	87,653	630,372	619,628	988	—	3	991	525	466 (c)									
Orange Free State.....	493,273	15,561	508,834	507,407	1,331	112	15	1,458	589 (d)	869 (e)									
Transvaal.....	940,311	236,220	1,176,531	1,143,843	3,397	57	37	3,491	1,225	2,266 (f)									
TOTAL.....	3,241,890	984,939	4,226,829	4,100,425 (g)	12,204	264	362	12,830	4,404	8,426									
(B) <i>Sub-Economic Housing.</i>																			
Cape.....	112,150	230,512	342,662	184,895	749	—	304	1,053	465	588									
Transvaal.....	9,400	—	9,400	9,400	25	—	—	25	25	—									
TOTAL.....	121,550	230,512	352,062	194,295	774	—	304	1,078	490	588									
TOTAL (A) AND (B)...	3,363,440	1,215,451	4,578,891	4,294,720	12,978	264	666	13,908	4,894	9,014									

(a) Includes a hostel to accommodate 86 persons.

(b) Includes 1,337 single rooms in blocks, 8 barracks and 160 flats.

(c) Includes 3 barracks and 36 single rooms in blocks.

(d) Includes a hostel for European girl employees at Bloemfontein.

(e) Includes 24 single rooms in blocks, the balance of 845 representing the approximate number of dwellings to be built out of a total loan of £14,761 made to three Local Authorities for use exclusively in purchasing materials to be advanced to Coloured persons and Natives building their own homes.

(f) Includes 303 single rooms in blocks, 3 compounds and 13 hostels.

(g) Includes £939,456 re-issued out of repaid capital.

The reduction in the rate of interest from 5 to 4 per cent. on loans for economic housing as from the 1st September, 1933, did not bring about, as was hoped, a speeding up of building activity under the Housing Act and it is disappointing to record that not more than £119,435, made up of £767 drawn from Treasury funds and £118,668 representing re-issues from repaid capital, was advanced during the financial year 1933-34 to local authorities for payment of work done and services rendered in assisting the housing on economic lines of persons belonging to the class the Act is intended to benefit. In addition an amount of £54,195 was advanced in connection with the carrying out of sub-economic schemes so that for the two classes of housing a total of £173,630 was drawn by local authorities during 1933-34 from loan funds under the Act. While this slow progress was mainly attributable to the continued caution displayed by local authorities in embarking on fresh schemes, a factor which also had a bearing on the matter was the cheap money available from other than Government sources which some of the larger municipalities decided to borrow for financing additional building undertakings and redeeming loans previously raised at a higher rate of interest.

The repayment during the year by the Durban Municipality of the balance of its loan indebtedness under the Act amounting to over £400,000 followed by similar action taken or contemplated by other local authorities led to the passing during the last Session of Parliament of the Housing Amendment Act, No. 68 of 1934. The object of this Amending Act is to obviate possible profiteering on the part of local authorities raising loans at the cheaper rates of interest now available for the purpose of repaying to the Provinces moneys advanced by the State for housing without passing on the benefits to those who rent or own the houses erected out of such moneys.

As the money repaid by the Durban Municipality referred to in the preceding paragraph was surplus to the Province's requirements for housing purposes under the Act, it was surrendered in full by the Natal Provincial Administration to the Treasury as not required for re-issue. A sum of £43,827 was similarly surrendered to the Treasury by the Orange Free State Provincial Administration as surplus to its requirements. Notwithstanding the foregoing surrenders the funds representing repayments of capital which remained in the hands of the Provinces as available for re-issue proved sufficient for meeting the claims for payment coming forward from local authorities and accordingly, except for a small issue of £767 made at the beginning of the year, there was no call on the Treasury by Provincial Administrations for advances of new money out of the £100,000 provided on the Loan Estimates for economic housing during 1933-34.

With regard to loans for sub-economic housing, a matter of note was the reduction in the rate of interest from 3 to 2 per cent. with effect from the 1st April, 1934. Hitherto it has been a condition attaching to the granting of this class of loan that the money be utilized only for assisting local authorities to provide housing for the very poor among the European and Coloured population and not for facilitating the working of the Natives (Urban Areas) Act, No. 21 of 1923. Recently, however, it was decided to grant the Central Housing Board wider discretion and to allow the Board in special cases to recommend the financing of location schemes out of sub-economic loans. Thus, while schemes designed to meet an ordinary and normal demand for additional accommodation in native locations will continue to be financed out of loan funds set aside for economic housing, it will be competent, where the local authority is able to show that the contemplated scheme is connected with the enforcement of special measures for ridding its area of slum conditions which are a menace to the public health, to deal with the application as one eligible for financial assistance out of sub-economic loan funds.

It is a condition governing the granting of sub-economic loans that the local authority bear a loss on the scheme equal to the loss to the Government in advancing the money at the sub-economic rate, and it has been decided in consultation with the Treasury that in the case of schemes financed out of loans bearing the reduced interest rate of 2 per cent. that the rentals of the houses be fixed at a figure which will involve the local authority in a loss on the scheme of $1\frac{1}{2}$ per cent. It is not intended, however, that the question of loss should be considered in the case of a Utility Company scheme financed out of a housing loan granted through the local authority in terms of section 6 as here, in contradistinction to a scheme carried out by a local authority in terms of section 5 which permits of the granting of a loan covering the full cost of the scheme, the company is placed under the obligation of having to find somehow 20 per cent. of the cost of the scheme.

On the loan estimates for the financial year 1934-35 a sum of £500,000 has been provided for sub-economic housing and £100,000 for economic housing. In addition there are the repayments of capital falling available for re-issue in connection with economic housing which according to estimates received from the various provinces and including the unissued balances in hand at the beginning of the year will total approximately £200,000. Ample

funds will thus be available for both classes of housing. The position was fully explained in Departmental Circular No. 4 addressed on the 20th April, 1934, to each urban local authority and wherein these bodies were urged to avail themselves of the loan facilities under the Act for remedying conditions of bad and insufficient housing in their areas.

Following the reduction in the interest rate on loans several local authorities made application for schemes completed by them out of economic loans to be converted into sub-economic loan schemes and for the reduced rate of interest to be charged on the unpaid balances of loans raised at the higher rates. In notifying the applicants that their requests could not be entertained it was pointed out that well over £3,000,000 had been issued by the Government for economic housing since the commencement of the Act and that the bulk of this money had been raised in long term loans at an average of 5 per cent. interest; that as the money is repaid to the Provincial Housing Loan Funds Account it becomes available under the amended Treasury Regulation for re-issue to local authorities at 4 per cent., the Government thus actually already losing what is practically one per cent. interest on all re-issues; and that while in view of the improved financial position the Minister felt that he was able to advise the Government to accept this loss (which in the aggregate will amount to a large sum) he did not feel justified in pressing the Treasury to agree to the writing down of interest rates on economic loans issued prior to 1st September, 1933.

The foregoing brief review of housing would not be complete without reference to the passage during the last Session of Parliament of the Slums Act, No. 53 of 1934, and the increased responsibilities placed thereunder on certain local authorities. By Proclamation No. 96 of 1934, the Act came into operation within the areas of the eight local authorities included in the first schedule thereto with effect from the 25th June, 1934, namely the Municipalities of Bloemfontein, Capetown, Durban, East London, Johannesburg, Pietermaritzburg, Port Elizabeth and Pretoria. In terms of section 1 (3) the provisions of the Act may by proclamation be extended to other areas on application of the local authority concerned and in consultation with the Administrator of the Province in which the place is located. The central purpose of the Act is to require the local authority to take all lawful, necessary and reasonably practicable measures for preventing nuisances and ensuring the provision of suitable housing in its area, and to this end increased powers are conferred on local authorities for dealing with nuisances without the intervention of the Magistrate, the Courts only being drawn in when failure to obey the local authority's order becomes an offence. Among other important provisions of the Act is to be noted the wide discretion allowed the local authority in declaring insanitary premises or unhealthy areas to be a slum; the ready, effective and cheap methods of enforcing evacuation of slum property; and the powers for enabling the local authority to acquire not only the land on which slum property is situate but also the adjoining and surrounding land if necessary for providing a suitable cleared area. For the latter purpose loan funds under the Housing Act may be utilized subject to the approval of the Administrator, but it is not possible at this early stage to gauge the extent to which housing loan funds are likely to be drawn upon during the current financial year in connection with contemplated slum clearance schemes. Representations on the subject have, however, been made to the eight local authorities in question and information is now awaited as to the nature of the steps they propose taking under the Act for dealing with nuisances within the meaning of section 1 (2) which are known to exist in their areas.

2. *Milk Supplies.*—Milk is a very important article of food. Indeed during infancy it is indispensable. Unfortunately it is also very suitable for the multiplication of many of the germs which are pathogenic to man. For that reason interests of public health demand the highest degree of cleanliness during the production and any subsequent handling of the milk. Even in those towns where the supervision of milk supplies has been very highly developed the spread of infection of diseases such as typhoid is still periodically traced to this source.

While certain of our large towns such as Pretoria, Bloemfontein and Johannesburg have developed a very high standard of control there are others which are still very far from satisfactory and where the risk of spread of infection by means of milk is at times great. Thus enquiry during the year in Capetown revealed much that was unsatisfactory. Premises were found to vary very greatly as regards suitability and general cleanliness. Milk sold in some of the poorer parts of the city was definitely dirty. Insufficient discretion is exercised in the granting of licences for the sale of milk. They are often granted to shops which do not restrict their sales entirely to milk and milk products. The trade is not infrequently in the hands of uneducated persons with no conception of what is meant by hygienically clean milk. Milk is still permitted to be sold in containers other than bottles which are mechanically sealed by means of discs. A bacteriological standard of cleanliness has not yet been laid down by regulation. The City Health

Department has, however, of late been taking samples of milk for bacteriological examination by the Government Pathologist with a view to ascertaining practicable standards of cleanliness. Further delay in tackling this important matter is liable seriously to endanger the public health.

In Kimberley conditions in the milk trade were also found to be unsatisfactory. These are to be attributed primarily to the keen competition resulting from the excessive number of small traders. Dairy regulations were found to be ignored with impunity by certain milk purveyors. Last year there were approximately one hundred prosecutions for contraventions. The commonest were for delivering milk in cans instead of standard bottles, bottling the milk in the street, pouring milk from one can into another in the street, selling of milk by unlicensed dairymen, and returning dirty milk cans to wholesalers.

In Pietermaritzburg a portion of the milk sold is pasteurized previous to delivery to the consumers. The sale of raw milk in the borough is not, however, entirely satisfactory, although a general tightening up of the control permitted by the existing by-laws during the past year has resulted in considerable improvement in cleanliness and safeness. Dairy premises are only registered after they have been inspected and approved as complying with the requirements of the by-laws. Only 35 per cent. of the milk is sold in sealed bottles at the present time. Until two years ago only 8 per cent. of the milk was so delivered. Much of the milk is still sold from tapped cans. This will be rendered illegal by the proposed new by-laws. Here too the production of milk of a high standard of cleanliness is rendered difficult by the keen competition resulting from the large number of small dairymen. There is still no special medical examination of milk employees, and no attempt is made to produce tuberculosis-free dairy herds by utilizing the tuberculin test.

In East London the control exercised over dairies was found to be insufficient chiefly owing to the shortage of staff.

In Durban very satisfactory by-laws have been adopted; but difficulties are often encountered in their enforcement. Thus the sale or delivery of milk except in unventilated sealed containers, bottles or cartons is prohibited. But this is often evaded and frequent prosecutions are necessary to suppress the illegal filling of "extra" bottles in the street. Natives have been seen removing the disc from a quart bottle, filling two pint bottles which are then covered with discs taken out of a filthy packet. The excellent campaign for destroying dairy cattle that gave a positive reaction to the tuberculin test was unfortunately discontinued in 1930; many of the animals that gave a positive reaction were not destroyed since this was not compulsory. The resumption of the routine use of the tuberculin test as a means of separating reactors from healthy animals is being considered. The proposed scheme will include routine veterinary inspection of herds, slaughter of animals which show clinical signs of tuberculosis, tuberculosis-testing of all herds with separation of reactors from non-reactors, and regular bacteriological examination of samples of milk from reactors.

While the supervision of milk supplies in the larger towns is thus seen to leave much to be desired, the conditions in many rural areas cannot be described as short of deplorable and constitute a grave danger to the health of the community supplied.

3. *Slaughtering and Meat Inspection.*—Greatly to be welcomed was the promulgation of the Slaughter of Animals Act, 1934, designed to prevent cruelty previous to or at the time of slaughtering animals. The Act provides that after January, 1935, no butcher may kill any bovine by any method depending on human muscular energy such as pithing or pole-axing. This means in effect that only those mechanical instruments generally known as "humane killers" may in future be used in the Union for slaughtering bovine animals. It is further provided that in abattoirs where more than 50 bovine are slaughtered monthly they shall not only be killed by humane methods, but must be killed in a pen to which they must be driven in single file along a "race" or gangway. It is to be hoped, however, that even the smaller abattoirs will adopt the "race" system when its great advantages over the older method of dragging the animal to a ring are appreciated.

Under the Act every butcher, and every person acting on his behalf, is required to obtain a license from a local authority. The licensee must be a male of at least 18 years of age, and must in the opinion of the local authority be a fit and proper person to hold the license.

The Animal Welfare Society of South Africa (P.O. Box 2134, Capetown), have, with the approval of this Department, published a revised edition in both English and Afrikaans of their handbook "Humane Slaughter and Model Abattoirs" (Pynloos Slag en Model-Abattoirs). Its object is to describe the methods for humane slaughter prescribed by the 1934 Act. It supplies very useful practical information which will be of

great assistance to butchers in carrying out the provisions of the Act. The notes and diagrams in the handbook make it clear that the requirements of the Act can be adopted by even small abattoirs at a very small cost. At most a few structural alterations will be required; rebuilding will not be necessary if the abattoir is in other respects satisfactory. The primary object of the plans illustrated is to demonstrate the manner in which the race-and-pen system may be introduced at abattoirs where the obsolete methods have hitherto been in use. The mechanical devices described are already in operation at the municipal abattoirs in Bloemfontein, Capetown, Durban, East London, Johannesburg and other towns in the Union as well as in Salisbury, Southern Rhodesia.

Measly Meat.—In January there was considerable agitation in the minds of certain members of the public, more particularly in Durban, when it was widely advertised that under certain carefully controlled circumstances the sale of meat derived from animals lightly infected with bladder-worm disease was permitted. The Regulations under the Public Health Act as recently amended require that if ten bladder-worm cysts are found altogether, or six in the carcass apart from the head, tongue, pluck, stomach and intestines, that carcass must be condemned or destroyed. If less than those numbers respectively are found, the owner is permitted to destroy all infection by arranging for freezing in cold storage at -10° C. for 14 days; thereafter such meat may be passed as fit for human consumption.

Objections on sentimental or aesthetic grounds were raised to the eating of infected meat, however carefully it had been treated to remove all possible danger. It must, however, be borne in mind that no routine incisions can possibly detect every case of bladder-worm infection. The routine incisions required by the Regulations to be made in the carcass were selected as those most likely to determine the presence of disease. Where there is any evidence whatever of measles, certain additional incisions have to be made in those situations where this disease is commonly to be detected. But even with these precautions it has been proved that lightly infected carcasses not infrequently escape detection. Cysts are so small that a carcass would have to be cut up into very small fragments to ensure with absolute certainty the absence of all infection. This was conclusively demonstrated by an experienced veterinary officer in Germany. After subjecting several carcasses, which had been passed as fit for consumption at the routine abattoir inspection, to the detailed examination indicated, it was found that a proportion were actually infected. There can be no doubt, therefore, that a certain proportion of carcasses, passed as fit by abattoirs drawing meat from the various measles-infected areas, are lightly infected with the disease. That infection from this source is so seldom conveyed to man is attributable to the fact that cooking, like freezing, is highly fatal to the cysts. But for this fact, it is probable that a much larger proportion of the European population of the Union would be infested with tape-worms.

That freezing of meat does destroy the cysts has been settled beyond doubt as the result of numerous experiments made by various eminent authorities. Thus Kallert in 1931 satisfied himself after a great many careful tests that *C. bovis*, when once frozen, is dead in contrast to many other organisms pathogenic to man that can survive freezing. He investigated also the rate of cooling of beef quarters, and found that *C. bovis* is completely killed in hindquarters kept at -10° C. for 10 days, and in forequarters kept for 9 days. His observations have been confirmed by many competent authorities and are now universally accepted. While a period of ten days freezing has thus been found to be adequate, it has been extended in our Regulations to 14 days, to allow a liberal margin of safety. Our regulations were drawn up in consultation with the leading local veterinary and medical experts, and were not promulgated until their views had been confirmed by further expert advice obtained through the British Ministry of Health.

In a city such as Port Elizabeth or Durban which draw much of their meat from areas where cattle are known to be infected with measles, it is unavoidable that a proportion of the lightly-infected carcasses escape detection, and so are passed as fit for human consumption. In such cases it is only cooking which protects the consumers. A large proportion of the lightly-infected carcasses are, however, detected and are either condemned or rendered safe for human consumption by 14 days of freezing. Heavily infected carcasses are of course all destroyed. Hence meat which has been frozen in accordance with the regulations can be guaranteed as absolutely safe, while that which has not been frozen cannot always be considered quite safe unless well cooked.

It is of interest that occasional cysts are not infrequently found in absolutely prime carcasses, usually only in the head. There is no justification whatever for the destruction of such carcasses if freezing facilities are available.

The objection to measly meat even after it has been rendered safe by freezing reveals a valuable awakening of the public which will have salutary

effects. The demand that frozen meat exposed for sale shall be labelled is growing and is a reasonable one. By meeting this demand it will become of even greater interest to farmers to prevent their cattle becoming infected with measles. This can only be done by supervising the sanitary habits of their Native employees. Either they must be provided with latrines or they must be restricted to areas of the farm from which cattle are excluded.

4. *Child and Maternal Welfare*.—A long overdue commencement has been made with regard to the organisation of a section of the Department to deal specially with the very important subjects of child and maternal welfare. In May, 1934, there were appointed a woman medical officer to inspect and advise local authorities, and three itinerant nurse lecturers to address gatherings of women and do other preventive work, with a view to educating particularly the poorer sections of the community in matters of hygiene, ante-natal and infant care. The object is ultimately to establish a district nursing service throughout the country, but until the report of the Provincial Finance Commission is available and has been considered by the Government, no definite scheme can be launched. The work at the moment is entirely informative. Tours are being undertaken by the nurse-lecturers in urban and rural areas to investigate the conditions as regards nurses, nursing homes, clinics and charitable organisations, already in existence, with a view to using this information in correlating the schemes.

The need for these services is testified to eloquently by the infantile and maternal mortality rates shown in tables O (i) and (ii), although the infantile mortality for 1933 shows a considerable improvement on that of previous years; it is, in fact the lowest yet recorded in the Union.

TABLE O (i).—EUROPEAN INFANTS: BIRTHS AND DEATHS UNDER ONE YEAR REGISTERED AND INFANTILE MORTALITY RATE, I.E. DEATH RATE PER 1,000 BIRTHS, 1919-1933.

Year.	Cape.			Natal.			Transvaal.			Orange Free State.			Union.		
	Total European Births Registered.	Deaths of European Children under One Year.	Death-rate per 1,000 Births.	Total European Births Registered.	Deaths of European Children under One Year.	Death-rate per 1,000 Births.	Total European Births Registered.	Deaths of European Children under One Year.	Death-rate per 1,000 Births.	Total European Births Registered.	Deaths of European Children under One Year.	Death-rate per 1,000 Births.	Total European Births Registered.	Deaths of European Children under One Year.	Death-rate per 1,000 Births.
1919.....	16,749	1,351	80.66	2,910	191	65.64	15,338	1,326	86.45	4,727	382	80.81	39,724	3,250	81.81
1920.....	18,425	1,654	89.77	3,256	235	72.17	16,768	1,576	93.99	4,996	448	89.67	43,445	3,913	90.07
1921.....	18,062	1,382	76.51	3,370	203	60.24	16,582	1,374	82.86	5,288	379	71.67	43,302	3,338	77.09
1922.....	18,248	1,294	70.91	3,294	180	54.64	16,370	1,292	78.92	4,920	357	72.56	42,832	3,123	72.91
1923.....	18,296	1,353	73.95	3,229	197	61.01	15,619	1,261	80.74	5,037	328	65.12	42,181	3,139	74.42
1924.....	18,730	1,296	69.19	3,410	273	80.06	15,287	1,171	76.60	4,919	382	77.66	42,346	3,122	73.73
1925.....	18,366	1,343	73.12	3,509	206	58.71	16,348	1,059	64.78	5,188	361	69.58	43,411	2,969	68.39
1926.....	18,675	1,196	64.04	3,588	189	52.68	16,304	1,186	72.74	5,309	273	51.42	43,876	2,844	64.82
1927.....	18,537	1,293	69.75	3,435	166	48.32	17,050	1,359	79.71	5,325	314	58.97	44,347	3,132	70.63
1928.....	18,032	1,240	68.77	3,514	184	52.36	17,949	1,370	76.33	5,318	365	68.63	44,813	3,159	70.49
1929.....	19,008	1,169	61.50	3,650	177	48.49	18,227	1,342	73.63	5,334	280	52.49	46,219	2,968	64.22
1930.....	19,468	1,332	68.37	3,641	159	43.65	19,108	1,386	72.54	5,317	300	56.42	47,534	3,177	66.84
1931.....	19,180	1,182	61.63	3,538	162	45.79	18,733	1,267	67.65	4,975	317	63.72	46,423	2,928	63.07
1932.....	18,284	1,205	65.90	3,373	204	60.48	18,376	1,402	76.30	4,911	271	55.18	44,944	3,082	68.57
1933*.....	18,062	981	54.31	3,460	167	48.27	18,572	1,277	68.76	4,714	276	58.55	44,808	2,701	60.28

* Preliminary Figures.

TABLE O (ii).—MATERNAL MORTALITY: EUROPEANS.

Year.	Live Births Registered.	Deaths due to Puerperal Causes.				
		Number.		Rates per 1,000 Live Births.		
		Puerperal Sepsis.	Other Puerperal Causes.	Puerperal Sepsis.	Other Puerperal Causes.	Total Puerperal Mortality.
1926.....	43,876	88	112	2.06	2.50	4.56
1927.....	44,347	101	112	2.28	2.53	4.81
1928.....	44,809	102	121	2.28	2.70	4.98
1929.....	46,219	140	103	3.03	2.23	5.25
1930.....	47,536	119	131	2.50	2.76	5.26
1931.....	46,423	116	102	2.50	2.20	4.70
1932.....	44,944	126	113	2.80	2.51	5.31
1933*.....	44,808	113	101	2.52	2.25	4.77

* Preliminary.

Maternity is always attended with some unavoidable risks. Maternal mortality and morbidity rates can unfortunately not be reduced to zero. It is important that the lay public which is sometimes excessively critical should appreciate this fact. But in the Union our figures for these rates are still very far from the irreducible minimum which should be the aim of adequate care and treatment.

Lessening of maternal and infant morbidity and mortality will result from proper education. During the last years of school the rules of hygiene, physiology and diet should be taught. One of the most important parts of every girl's education is mothercraft training which should include those simple procedures and precautions, ignorance of which has caused many a mother to cause injury often life-long, to herself and her child. Even more effective teaching should be directed to the expectant mother. She should be educated particularly in ante-natal and post-natal care and supervision. Clinics alone will not suffice. They must be supplemented by health talks and practical demonstrations on diet, cookery and clothing. There should in short be at each centre not only a clinic but a school for mothers, where each mother or expectant mother will receive individual advice on the feeding, clothing and training of her own baby.

Ante-natal advice alone will not secure an uncomplicated labour. It must be followed up by expert nursing and medical attendance during and subsequent to labour. This will only be practicable when we have a midwife service as part of the public health services of the country. The midwives after qualifying should be definitely attached to clinics conducted by maternity officers. It is a platitude that to ensure prevention of infection, aseptic conditions must be observed during labour. Obstetric outfits should be supplied to the midwives from existing maternity hospitals or homes which would establish a liaison between the midwife and the advisory centre. When assistance is needed she could get this from the hospital.

Table O (iii) sets out the causes of deaths of mothers during the past year; this table brings out very clearly the preventable nature of most of these deaths.

TABLE O (iii).

Causes.	EUROPEAN DEATHS FROM PUERPERAL CAUSES—1932. (ACCORDING TO AGE PERIODS.)							EUROPEAN DEATHS FROM PUERPERAL CAUSES—1933. (ACCORDING TO AGE PERIODS.)								
	All Ages.	15-19.	20-24.	25-29.	30-34.	35-39.	40-44.	45 and Over.	All Ages.	15-19.	20-24.	25-29.	30-34.	35-39.	40-44.	45 and Over.
Post Abortive Sepsis.....	26	—	8	7	6	5	—	—	32	1	7	13	6	2	2	1
Abortion—not returned as Sepsis.....	8	—	1	3	1	1	1	1	7	1	—	1	1	3	1	—
Ectopic Gestation.....	7	—	2	1	2	1	—	—	11	—	2	3	4	2	—	—
Other Accidents of Pregnancy.....	5	—	1	1	2	1	—	—	1	—	—	1	—	—	—	—
Puerperal Haemorrhage.....	31	1	3	6	7	7	1	1	34	2	4	6	5	9	6	2
Puerperal Sepsis.....	100	9	22	20	20	19	1	1	81	9	14	23	8	16	10	1
Puerperal Albuminuria and Convulsions.....	29	2	11	7	2	4	—	1	15	1	3	3	5	2	1	—
Other Toxaemias of Pregnancy.....	1	—	—	1	—	—	—	—	1	—	—	—	1	—	—	—
Puerperal Phlegmasia—Alba Dolens, Embolism and Sudden Death.....	8	—	1	3	2	2	—	—	3	—	1	—	1	1	—	—
Other Accidents of Childbirth.....	21	—	7	5	3	3	—	—	24	—	4	4	6	7	3	—
Other or Unspecified conditions of the Puerperal State.....	3	1	—	—	—	2	—	—	3	—	—	2	1	—	—	—
Puerperal Diseases of the Breast.....	—	—	—	—	—	—	—	—	2	—	—	1	1	—	—	—
TOTAL.....	239	13	56	54	45	45	4	214	14	35	57	39	42	23	4	

There is one side of infant welfare work to which special attention should be drawn; it concerns the toddler, the child from 18 months to 5 years. Once the child is past infancy the mother ceases to worry over him, many a child healthy as an infant is found to be ailing when he reaches school life for want of proper management during the intervening years. The rôle of the nursing school would here fill a long-wanted need. The health, moral and physical, of the child would thus be supervised and by attention to diet, rest and modified exercise, the toddler's pre-school child's needs would be supplied.

5. *Nurses and Midwives.*—The serious shortage of trained and certificated nurses and midwives that has been stressed in previous reports still continues. The call for nurses is everywhere heard. Untrained women are still much too much in evidence. Local authorities should exercise greater care generally in registering unqualified women. The best type of woman will not adopt the profession of midwifery because employment afterwards is uncertain and conditions unattractive. Whereas if local authorities would employ a definite number of qualified midwives to suit their requirements, and if it was recognized that the service was an important one, many women would elect to enter it and thus help to remedy the acute shortage at present felt.

District nursing services are also urgently needed. Up to the present the Union Government has not directly subsidised district nursing schemes, applications for subsidy being referred to the Provincial Administrations. The latter are, however, now referring requests for subsidising such schemes to the Union Health Department. The time is clearly at hand for a decision to be arrived at as to whether such services should be a national or a provincial responsibility. There can be no question as to their necessity, and on general principles it is desirable that they should be regarded as a national responsibility. A District Nursing Service should be gradually built up and financed on the lines of our District Surgeons' service. It would not be entirely a pauper service, as the District Nurses would be available equally for the poor and those who are able to pay, but cannot under present conditions secure any trained nursing aid.

A Conference on rural nursing summoned by His Excellency the Governor-General in his capacity of President of the King Edward VII Order of Nurses was held at Government House, Capetown, in May, 1934. Valuable discussion occurred and much publicity was given to the grave shortage of trained nurses in rural areas. Schemes were suggested by various organisations. Such private schemes which will probably result in useful advance with regard to the problem cannot, however, be directly fitted into a national government scheme. The Government should aim primarily at obtaining nurses for areas not served by existing organisations by granting subsidies. The amounts provided should be sufficient to induce nurses and midwives to settle in such areas. The principle involved would be the same as that by which doctors are subsidised (under the style of District Surgeons) in places where the local community are unable to support resident medical practitioners.

6. *Health in the School.*—As has already been pointed out the apathy of many local authorities in regard to health matters is but a reflex of the apathy of the citizens who elect the local authority. To create a health-minded public it is necessary to begin with the children. Since the parents are in general apathetic, the necessary instruction must be given in the school. School curricula provide for such instruction, but there seldom appears to be any insistence on satisfactory teaching of the subject. Indeed it appears generally to be looked upon as the least interesting and least important subject. The teachers themselves are mostly lacking in the knowledge which could make of health-teaching the most fascinating of all school subjects. The tendency is rather to resent any time spent on hygiene that might have been devoted to a "failing" subject in which the class happens to be backward and on which the efficiency of the teacher is more likely to be judged. It is imperative, therefore, that hygiene be better taught at the normal colleges, and that hygiene be made a compulsory or failing subject in the schools.

Too much stress cannot be laid on this matter. It must surely be obvious that no subject taught in the school can be of greater importance than the subject of health. Unless the school-child can grow up into a healthy individual his value as a citizen is wasted. No amount of school learning will be of any value, if the citizen is physically unfit to undertake the duties of citizenship.

The degree of unfitness among young European adults is indicated by the high percentage of recruits rejected each year for the Active Citizen Force as detailed in a later section of this report.

The reports of the Chief School Medical Officers of the four Provinces indicate that there has been a marked increase in the number of children

medically examined during recent years; but the number found with defective health remains as high as ever. The percentage of defective school children in our schools is approximately as follows:—

Cape	34 per cent.
Natal	34 per cent.
Orange Free State	65 per cent.
Transvaal	48 per cent.

The most recent reports all indicate malnutrition in a large proportion of school children, more especially in rural areas. This malnutrition is to a large extent due not to insufficiency of food but to wrongly balanced dietaries. Correction of this fault will come with improved health education. The problem of the child suffering from the effects of actual starvation can, of course, only be solved by a general increase in prosperity. But starvation in its crude sense of extreme shortage of calories is of relatively uncommon occurrence. Much more serious is the monotonous diet of starch only rarely relieved by the addition of fruit, vegetables and dairy products which are of such very great importance in the dietary of the growing child.

The necessity for cleanliness is gradually being inculcated. Lack of it has in the past been responsible for much ill-health. Very much spade-work yet remains to be done in this direction.

Examination of the children by school medical officers is of great importance. But of necessity this can only be done at very infrequent intervals. Of at least equal importance is the follow-up work which is carried out by nurses. For this a large staff of school nurses is necessary. The present staffs appear to be entirely inadequate. Much of the benefit which might be expected to result from the early recognition of ailments is lost if the essential nursing service which should follow on such discovery is not available.

With regard to dental defects there is still very much ignorance. The general public and in particular parents should be made to realise that dental disease seriously undermines health and, if neglected, leads to grave physical disablement. The percentage of school children with defective teeth continues to be high. This is a consequence primarily of wrong feeding, both in the child and its mother before its birth, and secondarily of dental neglect particularly of early defects.

The aim of the school dental service is to secure that as many children as possible leave school with a sound set of permanent teeth; they should be trained in the care of the teeth and taught the necessary principles of dental health. Extraction of teeth for caries is always deplorable since such teeth could have been saved by treatment at an earlier age. A complete dental scheme should provide for conservative treatment of early defects of the permanent teeth. Dental caries occurs year after year in the treated as well as the untreated child; the school dental staff should be on a proportionately much larger scale than the medical staff.

In some rural areas where school dental clinics are impracticable, the names of children requiring dental treatment are put on lists which are sent to the local dentist or dentists, who make appointments for the children through the head teachers. This arrangement appears to be operating satisfactorily.

7. *General Hospitals.*—The system of routine inspection on behalf of the Provincial Administration of the State-aided hospitals and kindred institutions in the Cape Province, Orange Free State and the Transvaal was continued during the year. As in previous years, the hospitals on the Reef and in Pretoria were inspected by the Members of the Public Hospitals Advisory Council, while forty hospitals and aided charitable institutions were inspected and reported on by assistant health officers of this department as opportunity arose. Owing to a shortage of professional officers, it was found impracticable to inspect all the institutions in the three Provinces mentioned during the year, but the inspections are being systematically continued and with the staff available each institution will probably be inspected once in every two years. It is satisfactory to note that progress is still being made towards meeting the demands for hospital accommodation in certain areas and generally in improving conditions in the older hospitals of the Union. The position of the State-aided hospitals in the Cape, Orange Free State and the Transvaal Provinces, exclusive of the purely State institutions and those receiving a fixed grant-in-aid annually, is at present as follows:—

Cape Province	51
Orange Free State Province	9
Transvaal Province	26

The hospitals in Natal are State institutions with the exception of one which is subsidised.

In the Cape Province the work on the superstructure of the new Central Hospital in Capetown is making satisfactory progress. Plans for extensions

to the hospitals at Paarl, Worcester, Uitenhage, Lovedale and Aliwal North have been passed and the work will no doubt be completed in the near future. Two big schemes for modernising the hospitals in Kimberley and Queenstown were also commenced during the year.

In the Orange Free State a new Hospital Ordinance, No. 13 of 1933, came into force on the 1st April, 1934. This measure was designed to consolidate and amend the Law relating to the establishment, maintenance and management of Public Hospitals and kindred Charitable Institutions and is based largely on the existing Transvaal Hospitals Ordinance.

During the year a scheme for the erection of a new Maternity Home on the Central Hospital site at Bloemfontein was authorised by the Provincial Administration. This home will provide accommodation for 30 European patients and is estimated to cost £16,000. A small hospital was erected in Ficksburg by local enterprise and handed over to the Provincial Administration for maintenance as a public hospital under the Ordinance.

In the Transvaal Province plans were prepared and passed for extensions to the hospitals in Johannesburg, Germiston, Rustenburg, Potchefstroom, Heidelberg, Witbank, Ermelo, Pietersburg, Duivelskloof and Sabie. A new hospital at Vereeniging is nearing completion and satisfactory progress is being made with the erection of a hospital at Volksrust.

The financial provisions of the Public Hospitals Ordinance of the Transvaal have now been in operation for about three years, and, generally speaking, have proved satisfactory as far as hospital boards are concerned.

The hospitals in the Natal Province are not inspected by the medical officers of this Department, but as far as is known there is practically no change in the hospital position in this Province. It is understood that the scheme for erecting a new non-European hospital at Congella is in process of preparation.

Chronic Sick Hospitals.—The Cape Provincial Administration has prepared a scheme for the erection of a new chronic sick hospital at Pinelands near Capetown and it is anticipated that building operations will be commenced in the near future.

Up to the present no chronic sick hospital has been provided in the Orange Free State Province, though a few beds for chronic sick European patients are available in the Bloemfontein Municipal Isolation Hospital at Tempe. The need for accommodation for incurable cases in the Province is a very real one.

The Transvaal Provincial Administration has now accepted plans for the complete remodelling and enlarging of the chronic sick hospital at Rietfontein near Johannesburg, and it is hoped that the work to carry out the scheme will be commenced in the near future. The chronic sick hospital for Natal, situated at Hillcrest, near Durban, provides accommodation for approximately 100 patients.

8. Native Medical Education.—The amount of preventable suffering, disease and death prevailing in the Native territories has of recent years received considerable public attention. Various public bodies have drawn attention to the lack of medical and nursing services for Natives and have urged the granting of facilities for the training of Native doctors and nurses. The Government too appreciated the seriousness of the position, and in September, 1933, appointed an inter-departmental committee, consisting of the Secretaries for Public Health, Native Affairs and Education, together with Dr. E. H. Cluver of the Public Health Department, and Dr. A. J. Orenstein, Chief Medical Officer of the Rand Mines, Ltd., to investigate the position.

Health conditions among our natives are unsatisfactory. This is a simple statement of fact which cannot be gainsaid. The obvious evidence of this is that their numbers—where these are known—are increasing only very slowly. In other words the birthrate only slightly exceeds the deathrate. People of the same blood in America have been increasing at a prodigious rate although descended from only a few thousand ancestral slaves.

Unfortunately no accurate statistics regarding our Bantus are available. The last census was taken in 1921, although two European censuses have been taken in the Union since then. Registration of births and deaths is compulsory for natives only in urban areas. As the great bulk of them live in rural areas our information from this source is also very faulty.

The Bantu population of the Union is assessed at 5½ million. The infantile mortality, that is deaths of infants under 12 months, cannot be accurately ascertained for the reasons mentioned. But such sampling investigations as have been possible indicate that it is appallingly high. Our infantile mortality rate, although capable of much improvement, is relatively low. It is 60·28 per 1,000 live births per annum; whereas in England it is 67. But it is too frequently forgotten that this figure refers only to Europeans. If we could include non-Europeans in the estimation the figure would probably exceed that of countries which are admittedly of a very low sanitary level.

Later in life too the mortality among the Bantu is excessive. This high mortality must be attributed in the first place to the low social and economic status of these people. The diseases that levy so high a toll on them are those associated with poverty. A less serious but none the less important cause is the almost complete absence of medical and nursing services among them.

Low economic and social status is directly responsible for much preventable morbidity and mortality. The conditions associated with this low status may be summarized as—

Starvation and its sequelae;
 Typhoid and other forms of Enteritis;
 Respiratory diseases;
 Typhus;
 Other diseases such as Malaria and Bilharziasis.

To attribute most of the deaths among natives to starvation may appear startling. And yet there can be no doubt that this is literally true. The food in large portions of the native territories consists at certain times almost exclusively of mealie meal. In times of drought there is not infrequently a grave shortage of even this unsatisfactory form of food. Deaths, particularly of children, then occur from frank shortage of calories. But at all times the bulk of our Bantu population subsists largely on one of the most unsatisfactory forms of starch. Mealie meal is deficient in practically all the important constituents of a properly balanced dietary; protein, vitamins, particularly B, C and D, and minerals such as phosphorus and calcium. In it is abundantly present the toxic principle dubbed by Mellanby, toxamin, which could be counteracted by vitamin D if it were present. But it is almost entirely absent. Fortunately, plentiful sunlight, on a freely exposed body, to a considerable extent remedies the harm that would otherwise be done to the calcium-phosphorus metabolic activities. Because of the rich ultra-violet content of our sunlight, ricketts is practically unknown in the Union. But the deficiencies of an exclusive mealie meal diet show themselves in many other ways. Interference with the calcium-phosphorus metabolism is evidenced by bad dental development and tetany. The virtual absence of vitamin B₂ and C is responsible for the sub-pellagic and sub-scorbutic state of such a large proportion of the population of the territories. Outbreaks of pellagra and scurvy are common as soon as these people are made to do hard work. Hence the distressing outbreak of pellagra that occurred in the Durban prison command some years ago. The sub-scorbutic state of mine recruits is fully appreciated on the Witwatersrand. On the mines, experience has proved the necessity of allowing the new boys a period of loafing while they are permitted to eat as much as they like of the nourishing food adequately provided with protein and vitamins. These facts indicate clearly that even when the mealie pap is plentiful the natives are still being starved of the essential constituents of food. This starvation results in much morbidity and consequent mortality among them.

The association of the other diseases mentioned with low economic status has been repeatedly emphasized and need not be elaborated here.

The grave shortage of medical, nursing and health services generally among natives in the territories was studied by the Committee. Such medical services as are available may be briefly sketched. They consist of:

- (1) A mere sprinkling of doctors eking out an existence in private practice. Only natives with a little ready cash such as those recently returned from the mines can avail themselves of their services.
- (2) A part-time district surgeon in each of the magisterial districts, who, as far as his Government work is concerned, is required to do the medico-legal work in his district, undertake the treatment of venereal diseases, provide medical attendance to persons for whom the Government is responsible and carry out occasional investigations of outbreaks of disease that threaten to assume epidemic proportions.
- (3) A few doctors associated with missions whose work cannot be too highly praised, but who also touch only the fringe of native medical requirements.

All the qualified men available amount to very little. In many parts there is only one medical man to serve the needs of 30,000 people.

- (4) The inyangas or native herbalists of Natal and Zululand. Most of these are but thinly disguised witchdoctors. They are slowly being eliminated. They were permitted under the Natal Law of 1919 as medicine men amongst natives in Zululand, but since the commencement of the Medical, Dental and Pharmacy Act of 1928 no new inyanga licences have been issued except under very special circumstances on the order of the Minister of Public Health. The number of licensed inyangas in 1929 was 1,352; it

has now fallen to less than a quarter of that number, namely 322. The weight of opinion of magistrates, in the areas where they practise is that the chief stock-in-trade of the inyanga is necromancy and the appeal to the occult, combined with nasty-tasting medicines and strong emetics and purgatives. Their elimination is intentionally being carried out gradually to avoid resentment or antagonism among the native population. Licences must be renewed annually, and only three months' grace is allowed. This and the fact that practically no new licences are issued has resulted in the fairly rapid elimination of inyangas as indicated.

- (5) We come lastly to the witch-doctors, whose practice for gain is illegal, but who still have a very considerable hold on the native mind, particularly when the body is diseased. Their pernicious practices cannot be too highly condemned. They often actually tend to promote the spread of diseases such as typhus, by advising escape of sufferers and contacts from the evil spirits at the stricken kraal, thereby broadcasting infection. The terrible cruelty of some of their methods is well known in connection with the smelling out of the enemy alleged to be the cause of illness. In difficult labour their methods are often positively gruesome in the amount of pain and damage needlessly inflicted on the unfortunate mother.

Nursing services are provided outside the larger towns only by Missions and a few privately conducted homes. Some of these have attained very high reputations among native women and numerous pregnant women flock there for assistance during labour, largely apparently to escape the ministrations of the witch doctors.

Public Health services are virtually absent from the territories. The district surgeons are our front line of defence for combating infectious disease. They can do little more than act as scouts, reporting on outbreaks of disease which are brought to the notice of magistrates by chiefs and headmen. But the systematic combating of disease by means of propaganda among the natives is like all the rest of medical work practically non-existent. As a result, preventable conditions such as venereal diseases are spreading rapidly among the population. The few malaria, typhus and rodent inspectors employed by the Union Health Department and a few pamphlets in native languages on malaria, typhus, etc., cannot be expected to make any serious impact on the native mind.

The Inter-departmental Committee in its report emphasized the urgency of the need for a big step forward in the provision of health services in the Native territories and the necessity of training a Native personnel to make this possible. It was considered impracticable for the present to train a sufficient number of fully qualified Native Doctors to meet the great need within a reasonably short period. The institution of a full medical course for Natives in South Africa at this stage was therefore not recommended, though it was urged that some assistance should be given for a limited number of specially selected Bantus to proceed for a full course of medical study overseas. The Committee proposed the institution of a limited course in conjunction with the South African Native College at Fort Hare for the training of native medical aids on lines already adopted in other African territories, French and British, such training to consist of a year's pre-professional course with the junior certificate as the entrance standard, three years professional course, all taken at the Native College and a final year's clinical work at one of the large native hospitals. Such medical aids would be awarded a certificate which would not be a registrable qualification. Finally, it urged the creation of a native health service in which the native medical aids would be employed under the supervision of district surgeons or mission doctors, each medical aid being placed in charge of a dispensary with quarters attached at suitably selected places. The proposals of the committee have been discussed with the Federal Council of the South African Medical Association, and it has passed a resolution approving generally of the scheme in principle, it being understood that the medical profession would be consulted later in regard to the details. The importance of such a scheme being launched with the good will of the medical profession need hardly be emphasised.

The Medical Aid will be trained to do a certain limited number of duties very well. Thus he will be specially trained in first-aid treatment of illnesses and injuries, careful preparation of blood smears for malaria examination, of nasal smears for leprosy examination, sputum for tuberculosis examination, etc. In these matters high technical skill will be required of the Medical Aid. He must be capable of dealing with most of the ordinary ailments and injuries, and know when to call to his aid a medical man.

The only institution which can satisfactorily conduct such a course is the South African Native College, Fort Hare, where the students will be in surroundings for acquiring the correct attitude of service to their own people. With certain additions to staff and equipment for which provision has already

been made the complete course can be provided there. A handsome gift of £75,000 from the Chamber of Mines, Johannesburg, has rendered it possible to make an immediate start with the scheme and to ensure its continuance.

During the final year it will be desirable to distribute the students over several Native Hospitals such as that of the American Board Mission in Durban and the Native Hospital at Umtata. Such distribution will be guided by the area in which the Medical Aid has subsequently to work. It would obviously be desirable that those to be stationed in malaria areas should have training in hospitals where much malaria is dealt with.

In this brief summary it has obviously been impossible to deal with every aspect of native ill-health. It has only been possible to indicate the amount of preventable suffering, disease and death that is occurring at present in the Native reserves. Apart from any question of humanitarianism or of our duty to a subordinate race there is the obvious matter of self interest. Our mines and other industries are making increasing demands for cheap native labour. Owing to the poor health and physique of the natives in our own reserves half of those brought to the examining doctors by mine recruiters have to be turned down. For that reason we have had in the past to import some 100,000 natives from our Portuguese neighbour on the East and we are now arranging to import labour from northern tropical areas. Our present requirements could all be met from our own Native reserves if ill-health due to entirely preventable causes were removed. The obvious advantage would be that the money now taken out of the Union by this large army of natives would be spent in the Union. We would also remove reservoirs of disease which are a constant threat to the European community.

9. *Habit-forming Drugs.*—The enforcement of the regulations regarding opium, dagga and other habit-forming drugs continues to be carried out. This is done in co-operation with the Police, Commissioner of Customs and Excise and Postmaster-General. The following table shows the prosecutions and convictions:—

TABLE P.—SHOWING PROSECUTIONS AND CONVICTIONS UNDER LAWS RELATING TO HABIT-FORMING DRUGS DURING THE PERIOD 1ST JULY, 1933, TO 30TH JUNE, 1934.

Province.	European.		Native.		Asiatic.		Other Coloured.		Total.	
	Pro-secu-tions.	Con-vic-tions.	Pro-secu-tions.	Con-vic-tions.	Pro-secu-tions.	Con-vic-tions.	Pro-secu-tions.	Con-vic-tions.	Pro-secu-tions.	Con-vic-tions.
Cape.....	31	28	671	626	13	11	880	848	1,595	1,513
Natal.....	2	2	1,465	1,410	39	34	33	30	1,539	1,476
Transvaal.....	41	39	2,205	2,120	13	11	179	176	2,438	2,346
O.F.S.....	6	4	271	259	—	—	36	36	313	299
UNION.....	80	73	4,612	4,415	65	56	1,128	1,090	5,885	5,634

Of the total of 5,885 prosecutions, 5,878 were in respect of Dagga and 7 of Opium; 5 lb. of Opium and large quantities of Dagga were seized and confiscated.

The total quantities of habit-forming drugs imported into the Union during the year ended 30th June, 1934, were:—Opium, 600 lb. 985 gr.; Morphine, 40 lb. 4,167 gr.; Cocain, 33 lb. 4,752 gr.; Heroin, 10 lb. 1,512 gr.; Cannabis indica, 19 lb. 4,364 gr.; and Coca leaves, 28 lb.

The following habit-forming drugs were exported from the Union during the year ended 30th June, 1934:—Opium, 24 lb. 1,050 gr.; Morphine, 2 lb. 810 gr.; Cocaine, 1 lb. 900 gr.; Heroin, 200 gr.; Cannabis indica, 1,750 gr.; Dagga, 3,530 lb.

Every chemist and druggist or other person who ordinarily stocks habit-forming drugs is required in terms of Chapter 6 of Act No. 13 of 1928, to keep a register properly named and reflecting the quantity of the drug possessed, imported, or acquired by him; the date of importation or acquisition of the drug; the person from whom and the place from which the drug was imported or acquired; the quantities sold, supplied, used or administered, the purpose for which used, and the date of use, or the name and address of the person to whom sold, supplied or administered, and the date thereof. In the many instances where the registers were found not to be properly kept, warning notices were issued and generally proved sufficient to ensure compliance with the legal requirements.

Act No. 13 of 1928 makes it definitely illegal for a practitioner to prescribe a habit-forming drug to an addict to satisfy a craving for the drug. Medical practitioners may of course prescribe habit-forming drugs for a

definite curative or therapeutic purpose, but not to satisfy a craving, and no chemist may make more than two issues on the same prescription or order. Every order or prescription must contain the name and address of the person for whom the drug is required or prescribed and the name, address and qualification of the person signing such order or prescription. During recent inspections of chemists' registers it became evident that some medical practitioners were not complying with the requirements of the law through ignorance of its provisions or through carelessness. The co-operation of the Medical Association of South Africa has been sought in advising its members of the requirements of the law.

Considerable publicity recently has been given to statements by a medical man to the effect that the smoking of "dagga" is harmless or at any rate no more harmful than ordinary tobacco, and that the heavy penalties which the law imposes for growing dagga, trading in it, smoking it, or even having it in one's possession are to be deplored. From the further remarks of the writer it would seem that he was referring to the comparatively harmless "Cape Wild Dagga" (*Leonotis*) and not the genuine dagga or Indian Hemp.

As these remarks may have a harmful effect on the public health in that dagga smoking may be countenanced or even encouraged, an authoritative statement on the matter would appear to be called for. The legislation on the point quite clearly refers to the dangerous *Cannabis* which contains the volatile alkaloid Cannabinol. In the Fifth Schedule of the Medical, Dental and Pharmacy Act, 1928, it is referred to as "Dagga", "Intsangu" or "Indian Hemp".

The very harmful practice of smoking the flowering tops and young shoots of this plant is very widespread amongst the Native races of South Africa, notably the Hottentots, Swazis, Zulus and Basutos. Although not indigenous it grows freely in most parts of South Africa; it is readily grown by sowing hemp seed, or bird seed containing hemp seed. Several varieties of *Leonotis*—the so-called "Cape Wild Dagga"—grow wild in the Union. They have no special toxic or narcotic properties and are usually only smoked by the Natives when genuine dagga is unobtainable.

In various parts of our Native Territories such as Zululand and Natal many of the adult males are confirmed smokers of dagga. Its evil effects are, however, more evident on farms and in the towns where monotony of work and the absence of domestic and social amenities combine to increase the lure of a drug which offers not only forgetfulness of the drab environment, but also a sensation of well-being, courage and even exaltation.

Dagga is a habit-forming drug; its indulgence is apt to induce a craving which increases in strength until it is virtually irresistible. Withholding of the drug from confirmed smokers is an unbearable torture. As in most other drug addictions, the victim soon degenerates morally, becomes utterly untrustworthy, and will lie and deceive without scruple. Mental instability leads to quarrelsomeness and violence on the slightest provocation. Recurring hallucinations may end in actual insanity.

These few remarks will make it clear that the official steps that have been taken to combat the illicit trade in Indian Hemp are none too severe and it is to be regretted that any confusion has arisen on the subject. As far as is known to the Department no prosecutions have been instituted in connection with *Leonotis* which is readily distinguishable from *Cannabis*.

10. *Aerial Inland Ambulances*.—References to the subject in the Report of this Department of 1933 resulted in an early response from the Department of Defence. Brigadier-General Sir H. A. van Ryneveld, K.B.E., D.S.O., M.C., when Director of Air Services, had in contemplation the possibility of aircraft being required for the transport of patients. Primarily the idea extended only to the possible occurrence of injury or acute illness in the cases of members of the Union Defence Forces who might become casualties whilst employed on detached duties far removed from medical or surgical aid. The measures adopted in this regard were, however, easily adapted to civilian needs.

A number of Wapiti machines are amongst the equipment of the S.A. Air Force. This type of aircraft has been flown extensively in Iraq by the Royal Air Force. In that country of sparse population, problems of space became, in cases of acute illness or injury necessitating specially skilled attention, matters of extreme difficulty. These problems were to some extent solved by the adaptation of the Neil-Robertson stretcher to the design of the fuselage of the Standard Wapiti aircraft.

The Neil-Robertson stretcher, in its original form, was designed for use in the Royal Navy for transhipment of helpless patients in open roadsteads or in other circumstances where the use of the ordinary stretcher is impracticable. It consists of a bamboo and canvas casing into which the patient is strapped. The whole is then enclosed in a covering of waterproof canvas.

For aerial transport the apparatus is provided with blanket linings which allow the patient to be kept in a condition of comfortable warmth. A canvas hood can be used to cover the head and face. When enclosed in the stretcher the patient is effectively splinted and is so far protected otherwise that he may be transported by aeroplane in complete comfort even though he may be strapped to the outside of the fuselage.

In the Standard Wapiti, however, the Neil-Robertson stretcher may be suspended by straps to struts inside the fuselage. The S.A. Air Force have one Wapiti which can convey two patients in Neil-Robertson stretchers.

When not in use the Neil-Robertson stretcher is eminently portable; its total weight is 35 lb.

A try-out of the stretcher is described in "The Medical and Health Aspects of Aviation in the Union" by Sir Edward Thornton (S.A. Medical Journal, 26th May, 1934). A medical officer, who took an experimental "flip" in the apparatus, was of opinion that the recumbent position in an aeroplane was one of perfect comfort. He recorded the view that there are no ground ambulances which are as smooth as an aeroplane.

A severe injury was sustained, as the result of an accident, by a member of the S.A. Field Artillery who was employed on the foot-and-mouth disease cordon. The road and rail journey from Zeerust district to the nearest hospital would have necessitated some two days and much rough travelling for a case which was in a condition of collapse. In a few hours the patient had been removed by aeroplane to Roberts Heights. An urgent operation was performed which, in all probability, saved the life of the patient.

Nevertheless, convenient as it may be in circumstances of urgency, the Neil-Robertson stretcher is regarded merely as an emergency apparatus. The ideal type of aircraft for the transport of patients is that represented by passenger-carrying aeroplanes.

The needs of photographic survey in the S.A. Air Services resulted in the purchase of a "Gloster" two-engined aircraft. This machine has a cruising speed of 100 miles per hour. It can accommodate seven sitting-up cases exclusive of the crew and an orderly and has a cruising radius of 600 miles. With full load and with one engine out of action it can maintain a height of 9,000 feet above sea-level under normal atmospheric conditions.

When this aircraft was taken over by the Union Government a series of stretcher-frames were installed. These were designed and manufactured at the Aircraft Depot at Roberts Heights. Made of tubular steel, the frames can accommodate four lying-down cases on stretchers. When not in use the structure folds, by an ingenious and simple mechanical arrangement, against the inside of the fuselage.

Additional to the "Gloster" aircraft, the S.A. Air Force has acquired from Imperial Airways three passenger-carrying machines of the "Hercules" type. These aircraft have the low cruising speed of 80 miles per hour as contrasted with the 150 miles per hour of the latest types of commercial machines. They can be fitted, at short notice, for the accommodation of lying-down cases on much the same lines as apply to the "Gloster" machine.

In accordance with a statement made by him in Parliament, the Minister of Defence has arranged that aircraft of the S.A. Air Force which are capable of conveying patients may be placed at the disposal of members of the general public if available and upon application, subject to payment of the actual costs of petrol and oil and of the subsistence and transport expenses of the pilot. Naturally in these circumstances, the lighter types of aeroplane are the more economical. Whilst the average cost of the lighter types of machine work out to something in the neighbourhood of 4d. per flying mile, the twin-engined Gloster will cover only about 2½ miles to each gallon of petrol. The additional comfort of passenger-carrying planes is offset by the higher cost.

It follows, of course, that the facilities afforded to the public by means of military aircraft are confined to periods when such aircraft are not engaged in the normal duties of military service. This is a restriction which may be serious. But the arrangements are not designed to meet the needs permanently. Military aircraft are made available for ambulance transport as an interim measure in circumstances of urgency and pending the inauguration of aerial ambulance services otherwise.

The position in this regard will be much improved when facilities for conveyance of patients form part of the organisation of the ordinary passenger-carrying air routes. This need has not been overlooked by the newly-reorganised Union Airways (now under control of the S.A. Railways and Harbours Administration). Union Airways are purchasing multi-engined aircraft for use on the main air routes in the Union. These planes will be fitted to carry a stretcher case as part of the normal passenger load. At

the inception of the service there will be two main routes namely, Capetown-Durban, Durban-Johannesburg. The latter trip will be accomplished in something under two hours. Later, routes will be multiplied until the whole of Union territory is intersected with regular services.

The needs of the civilian population for transportation of cases needing urgent surgical or medical aid will not be fully met by the measures which will be adopted by Union Airways. It is easy to visualise an incidence of cases which will be far removed from stopping-places. Ambulance transport of the near future will comprise a minimum of conveyance by ground vehicles. Land transport, in the most favourable circumstances as to vehicles and highways, falls far short of the smoothness of air travel.

The question of aerodromes, too, falls to be considered. This is, however, a matter which forms part of the progressive policy which comes under the control of the Department of Civil Aviation. Practically every municipality in the Union has its aerodrome. Cleared spaces suitable for landing and taking-off of aircraft are multiplying rapidly. It may be asserted that an aerodrome every ten or twenty miles is a desideratum which is within possibility of early attainment.

Several types of privately-owned aircraft are also capable of transporting patients. Aircraft of this kind will serve admirably as feeders for the main passenger air routes. One well-known firm of wholesale chemists is contemplating the purchase of a machine of this type for the use of doctors and patients. Private enterprise in this regard is likely to extend as the obvious advantages become appreciated.

11. *Blindness.*—The Union is more fortunate than some other countries in the matter of blindness, but nevertheless it is estimated that the proportion of blind persons in the Union is approximately one per thousand.

It seems to me that the State has two duties in connection with this problem which it has inadequately carried out up to the present. Firstly it should take steps to ameliorate as much as possible the suffering of the incurably blinded. Secondly since at least one-half of all blindness is preventable, it should do all that can be done to prevent further cases of blindness occurring.

Amelioration of suffering of the blind consists essentially in training them in such a way that they can be usefully employed, and in finding the necessary employment for them. Regular employment is essential not only because blind persons should, if at all possible, support themselves, but also because lack of employment and interest leads to warped minds and general unhappiness.

Heretofore the care of adult civilian blind in the Union has been undertaken solely by voluntary private bodies such as the South African National Council for the Blind and its affiliated societies. The main aim of these bodies has been to help the blind to help themselves, and to provide them with work.

South African soldiers blinded in the Great War are in receipt of pensions from the State and allowances from the Governor-General's Fund and in addition have been well cared for by the South African Committee of St. Dunstan's, the funds of which are administered independently of the National Council Organisation. But neither the Central Government nor the Provincial Administrations have statutory provision to assist the civilian blind directly or—except in the case of the Cape Provincial Administration—to contribute to voluntary organisations who care for the blind. Under the provisions of the Cape Ordinance, No. 4 of 1919, it is possible for the Administration of the Cape Province to subsidise registered charitable organisations on the £1 for £1 principle to the extent of anticipated requirements which have been approved of by the Executive Committee. Unfortunately in recent years owing to financial stringency the provisions of the Ordinance have not been applied to new societies nor to the extension of subsidies obtainable under it. In any case any assistance given under the Ordinance would be in the nature of charitable relief only.

It seems to me that the best method of giving the relief that is required would be for the state to make, apart from the question of statutory pensions which seem to be indicated, a substantial annual grant to the National Council Organisation. There have been a few notable cases in the Union of blind persons who have triumphed over their disabilities to the extent that they have been entirely self supporting citizens, but these cases are exceptional. The greater number have dragged out a miserable existence dependent on their relatives or on charity.

Blind persons who have been trained for manual occupations should, if possible, be employed in workshops near to their homes. But, if such workshops are not available close at hand substantial subsidies become necessary for them to follow their trade as home workers, because under such circumstances tools, supervision, technical advice, assistance in the purchase of materials and in the marketing of the goods produced become necessary.

Even in workshops the employment of blind persons makes it difficult for an industry to show a profit if the workers are remunerated at commercial rates. The handicap of blindness usually prevents the workers from earning a proper livelihood on the open labour market. Their wages must, therefore, be augmented from other funds. In the interest of the health and well being of these people it is essential that such funds be forthcoming.

The governments of many countries provide special education for blind children. In the Union there is the School for European blind children at Worcester, and the Athlone School for non-European blind children at Faure. The former was established 52 years ago by the Dutch Reformed Church which, until 1925, financed it entirely without State assistance. It is now under government control and the Union Education Department pays the full salaries of the teachers and half of other approved expenditure. The National Council for the Blind has during the past four years contributed £1,200 for special purposes such as the Braille Press. The Athlone School was started privately in 1927 with assistance from the Government. The Union Education Department now pays two-thirds of the teachers' salaries and contributes on the £1 for £1 principle to other approved expenditure. The National Council has contributed £1,147 towards this school for special purposes.

Even more important than lessening the burden of those already blind is the combating of factors responsible for blindness. Some forms of blindness unfortunately cannot be prevented. There are some diseases which even if treated in the earliest stages cannot be arrested, and there are physical accidents which no ordinary precautionary measures can prevent. But the majority of blind persons could have been saved the calamity of blindness if the knowledge at our disposal had been applied. These preventable causes include venereal disease and untreated sore eyes of infants. Incorrect feeding of children is the cause of much defective vision due to the muscular weakness which accompanies the general debility.

Propaganda aimed at the prevention of blindness is of direct value to the State which should be interested in ensuring that it does not lose the productive power of those who may be incapacitated through loss of sight. The more adequate registration and supervision of midwives, the immediate reporting of all births, the compulsory instillation of 1 per cent. solution of silver nitrate into the eyes of every new-born child and the proper protection of the eyes of workers in many industries involving risk to the eyes are among the measures which should be pressed for.

Apart from total blindness partially defective vision causes much unhappiness, ill-health and loss of efficiency. If uncorrected in children, it interferes seriously with their school progress and may cause retardation. In the Union it is probable that at least two out of every thousand school children suffer from visual defects sufficiently serious to render it not only difficult but actually dangerous for them to follow the ordinary courses of instruction given to normal children. Praiseworthy efforts are being made by the National Council for the Blind to provide sight-saving classes as part of their general programme of prevention of blindness. It is realised by them that poor sight is not only a physical and educational handicap, but that it may actually develop into blindness unless the condition is discovered and treated in time.

Unrestricted Sale of Spectacles.—It is becoming increasingly evident that serious damage may result to the eyesight of members of the public by the unsupervised sale of spectacles. Many stores throughout the country sell large quantities of ill-adjusted and ill-fitting spectacles without any regard to or knowledge of the varying conditions of eyesight. Further, salesmen travel round farms informing people that they have serious eye-defects and selling them spectacles at ridiculously high prices. Instances have come to light of spectacles being sold to farmers at £10 and over by travelling salesmen who have had no training whatsoever in sight-testing.

The Department has, therefore, recently instituted enquiries into the matter with a view to bringing forward proposals for regulating and controlling the sale of spectacles. In this connection the Federal Council of the Medical Association of South Africa whose views were sought have referred the matter to the Ophthalmological Society of South Africa, a constituent Group of the Association consisting of all the recognised ophthalmic surgeons in the Union, for report and recommendation. This report is being awaited with much interest.

The South African Optical Association to whom the matter was also referred replied that the problem had for years past received the earnest consideration of its members, who were well aware of the dangers arising out of the present position. The Association deplored the detrimental effects of spectacles being prescribed by untrained persons and stated that it had felt for many years past that there was an urgent need for the recognition by the State of the calling of the properly trained opticians and that restrictions ought to be placed by law upon untrained persons who pretend to test eyesight and prescribe and supply spectacles for the purpose of correcting defective vision.

The Association expressed the opinion that the only entirely satisfactory method of combating the existing evils would be the passing of legislation prohibiting the prescribing and supply of spectacles except by an ophthalmic surgeon or a qualified optician.

It is earnestly to be hoped that agreement may be reached between the Medical Association of South Africa and the South African Optical Association so as to enable acceptable legislative proposals to be prepared by the Department for the consideration of the Government.

12. *Deafness*.—So little is known regarding the causes of deafness that it has not yet been possible for any country to adopt a satisfactory preventive policy. The causes of congenital deafness are almost entirely unknown; acquired deafness on the other hand results from such a variety of causes that direct preventive action is extremely difficult to organise. The more common causes could, however, be combated to a very considerable extent by propaganda directed towards the improvement of general hygiene. To this aspect of public health effort I have already referred at various times in this report. The extreme necessity of public health education, particularly of young persons emerges at every point.

Organisations such as the South African National Council for the Deaf will be of great value in emphasising the tremendous importance of recognising and attending to the first signs of deafness.

It will be impossible to advance to any extent in South Africa until we have been able to collect accurate statistics from which the chief determining causes of deafness in this country can be ascertained. With this information available the best preventive measures could readily be decided on. Such information is not easy to collect. Deafness is still very generally considered to be something of which to be ashamed. Older deaf persons are almost invariably found to object strongly to detailed questioning about themselves. Any suggestion that their trouble might be hereditary is generally greatly resented. Children in schools for the deaf or in classes for the hard-of-hearing are more likely to be free of those ingrained prejudices which make fruitful investigation among adult deaf persons so extremely difficult. Reliable record sheets could be kept in connection with them, which would be of great value in dealing with this difficult problem.

During the year a valuable report was published on the subject of deafness by the Rev. A. W. Blaxall, the first Chairman of the S.A. National Council for the Deaf. This report was the outcome of a study tour in America in 1931 made possible by the Carnegie Corporation Visitors' Grants Committee. Previous to that date Mr. Blaxall had, however, gained much knowledge and sympathetic understanding through living in close association with deaf people, blind people and doubly handicapped people in Great Britain and South Africa.

His essay on *The Life of a Deaf Person* should be read by everyone who is in a position to assist in any way in dealing with this distressing malady. In it are graphically set out the pathos of the first realisation by the parent that her child is deaf; the unwillingness to believe this, which not infrequently results in loss of valuable time in obtaining the advice necessary to ameliorate the handicap; the urgent necessity for the child to begin its education, and to obtain the best available education; the mental retardation which results from the spiritual isolation caused by deafness, and the great desirability for minimising the physical handicap by teaching lip-reading and articulation, thereby exercising the organs of speech with the result that the brain is stimulated from a very early age.

13. *Physical Fitness of Military Recruits*.—The examination of young male adults for the defence services of the country supplies useful data for assessing the general fitness of this class of citizen. The following analysis of the examinations made in Johannesburg during 1933 are therefore of interest.

Altogether 1,784 recruits were examined: 1,440 for the Active Citizen Force of the Johannesburg Military District, 274 for the Special Service Battalion and 70 for the South African Air Force (Artizan Section). Of the total number, 1,310 were passed as fit for service, 474 being rejected as unfit. The rejection rate (based on the total figure of rejections) was thus 26·6 per cent. and represented a reduction on the rate for last year (30·3 per cent.).

The rejection rate for recruits for the Special Service Battalion was a little lower (25 per cent.) than that for the general body of recruits examined for the Active Citizen Force.

As in previous years, the chief causes for rejection were defective vision, defective physique, defective dentition, diseases of the heart and deformities of the feet, these disabilities accounting for no less than 326 rejections, or 75 per cent. of the total.

Rejections for dental defects constituted 20 per cent. of the total rejections and this proportion represents a somewhat sharp rise upon the figures for the six years 1927-1932, during which period the proportion stood at an average of 15 per cent., varying from year to year between 12·5 per cent. and 17 per cent.

The lowering of the general rejection rate is probably merely an accidental occurrence, and no deduction of any value can be made therefrom.

14. *Agricultural Use of Arsenic.*—Arsenic is being used to such a great extent for agricultural purposes that the protection of the public against risk of poisoning has become a serious matter. It was introduced many years ago for combating East Coast Fever. More recently it has come into use on a very large scale for destruction of locusts.

Dangers of Locust Poison.—During the year enormous quantities, some 3,000 tons in all, of arsenite of soda were used for locust destruction in the Union and South West Africa. It is probable that even more will be required for this purpose next summer. The spread of so dangerous a poison on such an extensive scale obviously requires earnest consideration. A conference of technical officers which included an officer of this Department was arranged by the Secretary for Agriculture to investigate the matter. The matters that were dealt with at this conference included the possibility of pollution of water supplies; stock poisoning; wild life poisoning; accumulation of arsenic in the soil and its effects on crops and plant life generally.

The arsenic is used chiefly in the form of sodium arsenite, either in powder form or in solution, the arsenic and arsenious oxides having been found less satisfactory in their action on the locusts; they have less penetrating power than the arsenite and exert their action chiefly by being swallowed, whereas the arsenite will cause poisoning of the insects by direct penetration of the body. The arsenite is best used in solution. The feeling at the Conference was that the powder should only be used where transport difficulties make this unavoidable and then only under the supervision of specially trained officers.

Dangers of poisoning of human beings and stock arise from the arsenic in powder or solution form coming into contact with the soil, pasturage, mealie lands, sugar cane and other vegetable crops. These were carefully investigated. During the discussion it became clear that further experiments were necessary so as to establish with some degree of certainty the length of time during which arsenic under such conditions might continue to be a danger.

Interesting facts were recorded regarding the effect on animals. These varied from acute symptoms in which the quantity of arsenic absorbed could be readily ascertained, to chronic manifestations where it was no longer possible to detect the poison by the ordinary methods. In these chronic forms, confusion with various forms of animal disease is very liable to occur. Of great importance are the manner of excretion of arsenic, the length of time it remains in the body, the parts of the body in which it is found in the greatest concentration—*post-mortem*—and the tissues which should be used for its detection. These matters are being thoroughly investigated by the Understepoort Laboratory.

The advantage of the use of arsenic over other substances, which might be poisonous to locusts and not to mammals, is its great cheapness. Paraffin, for instance, costs 16 times as much—a gallon of arsenite solution works out at $\frac{1}{4}$ d. against 4d. for the paraffin.

Data are being collected regarding methods of protection for persons engaged in locust destruction by means of arsenic whether as powder or in solution.

Arsenic Poisoning on Colliery.—The dangers inherent in the unsupervised use of arsenic for cattle dipping was demonstrated by the poisoning of 180 Natives and 6 Indians at the Cambrian Colliery, near Dannhauser in Natal, among whom 5 deaths occurred in spite of vigorous treatment after the cause was diagnosed. The form of arsenic involved was the soluble salt, Arsenite of Soda which is used extensively in the Union in the preparation of cattle “dip”, a bath treatment for the removal of ticks, the vectors of East Coast Fever or Piroplasmiasis.

The non-European employees at the Mine began to be taken acutely ill in increasing numbers during the morning of the 2nd December, 1933. The symptoms consisted of urgent vomiting followed later by abdominal cramp, collapse and diarrhoea. It was subsequently ascertained that the poison was contained in the water used for the preparation of “maheu”. This article of diet, much favoured by mine natives, is prepared by mixing hot mealie-meal with an equal volume of water and adding some raw flour. It is then allowed to stand for about three hours during which time some fermentation takes place and is then ready to be consumed.

The water from which the maheu in question had been prepared had all been drawn from a tank in the compound, about 200 gallons of the water having been used for the purpose. At the enquiry that was subsequently held, the Magistrate's finding was that the arsenic had flowed into the compound tank by syphonage from a cattle dip some distance from the compound along connecting pipes.

The food ration on the morning of the 2nd December had consisted of approximately 5 pints of maheu per head. The "sickness" that occurred later was not realised to be associated with this food and a second ration of maheu was issued in the usual way that evening. As the "sickness" increased the maheu was suspected and no further ration was issued. Samples of the next day's ration of maheu and the water were sent for analysis and arsenic was found in the maheu, 0.12 grains per pint, and in the water used in its preparation 0.066 grains per pint. The water from which the second day's ration of maheu was prepared had, as was subsequently ascertained, been diluted twice after the admixture with fluid from the cattle dip. By careful calculations of the amount of water used in the preparation of the maheu and the amount of the latter consumed by the natives it was ascertained that the average amount ingested by each employee was between 4 and 5 grains.

The acute symptoms began to subside after the third day. The cases were then changing from the acute to the chronic form, as is common after a single dose of arsenic.

The first death occurred on the 5th day after the poison was ingested, the second on the 7th, the third on the 9th, and the fourth on the 17th and the 5th on the 18th day.

Dr. B. Sampson, Government Pathologist, Natal, examined the patients on the 12th day of their illness. He reported a diversity of manifestations of chronic arsenical poisoning which seem worthy of record. These included rashes, conjunctivitis, swelling of the eyelids, elevation of temperature, oedema of the penis and scrotum, catarrh of the respiratory system, salivation and lachrymation, sensory and motor disturbances which will be described in more detail. Owing to some hereditary chest weakness of the Bantu he is very liable to go down with broncho-pneumonia whenever his resistance becomes seriously depressed from any cause. This is probably due to an invasion by his own pneumococci, and is probably the explanation of several cases of pneumonia which occurred, and was the immediate cause of some deaths.

It is not always easy to be sure of a rash in the skin of a pure Bantu or Indian, especially as the former often normally have all manner of irregularities of the outer dermis. But in quite a number of these boys the rash was a definitely papular one, and was most noticeable round the neck, on the shoulders, upper arms and chest. Between the papules there was a punctate condition on the skin which was more obvious to touch than sight, but one could not be sure that it was an erythema. The rash was not an irritating one, but peeling occurred at a later date in those cases where a rash had been previously evident.

The elevations of temperature ranged from 99 in the morning to 101 at night. But this was by no means present in all. As in everything else some constitutions are more resistant to poisons than are others, and it was only in the worst cases that an elevation of temperature was seen. Whether it represented a direct effect of arsenic on the heat regulating mechanism or was merely secondary to a bronchial catarrh cannot be decided. Certainly catarrh of the respiratory system was a common feature all through.

Scrotal oedema is not a common manifestation of chronic arsenical poisoning, but in this series there were five unequivocal examples. It was not secondary to an orchitis. Possibly the capillaries of this tissue are peculiarly susceptible to arsenic, and oedema here may be an indication of similar damage to the capillaries of the splanchnic area, for which arsenic has such a predilection. But it did not appear that these cases were more markedly dehydrated or exhausted than some others who did not have this scrotal condition.

It is very difficult to be sure how much apparent motor disability was not merely due to loss of sensory impulses and muscular weakness. On making some of these boys walk, one would have supposed that they were suffering from a degree of Locomotor Ataxia, or that their muscular co-ordination was at fault. At any rate, they walked very uncertainly in a somewhat staggering manner on a wide base. But realising that the cutaneous sensation of the feet was impaired, and that this was coupled with a marked degree of muscular weakness, there was explanation enough for any ataxy. Nor was this ataxy accompanied always by a loss of either knee or ankle jerks. In most cases, however, neither ankle nor knee jerks could be elicited. In two cases actually an extensor plantar reflex was obtained.

In two cases there appeared to be a definite "dropped foot" involving both feet. This is interesting, as arsenic is supposed to have a greater predilection for sensory nerves than for the motor. No cases of dropped wrist were seen.

A number complained of pain and numbness in the legs and hands. There was a marked loss of flesh in those showing peripheral neuritis.

During the acute phase of the attack, the boys complained of severe pain in the upper abdomen, but this was not accompanied by any involuntary muscular rigidity, and tenderness was only elicited on deep palpation. Profuse salivation and lachrymation were present in a few cases. No ocular signs accompanied these. In some the tongue was very furred; in others perfectly clean. In most cases there appeared to be inflammation of the fauces and soft palate. Pulse rates, though accelerated during the acute phase from dehydration and shock, were eventually proportionate to the temperature. It did not appear that the young stood up to the poison better than the old.

Three natives were still unfit for work, five months after the outbreak, because of peripheral neuritis—oue of these being bed-ridden and unable to move his lower limbs.

Post-mortem examinations of the deceased were made by Doctors Vaughan, Edwards and Campbell. One feature was common to all: inflammation of the mucous membrane of the duodenum. It extended upwards through the pylorus, but, unexpectedly, it was not very evident in the stomach and it did not appear to continue much into the jejunum. Had these cases survived longer, ulceration in the duodena would probably have been present, this being a later stage of chronic arsenical poisoning. The heart muscles were unduly pale in colour. The kidney structures stood out in marked contrast to one another, notably the pyramids from the other tissue, the capsules stripping easily. The liver was not enlarged, but here again differentiation of structure was more than normally evident. There is little doubt that the tissue differentiation which was found was due to a capillary dilatation in the organs concerned.

15. *Anaesthetics*.—The relatively heavy death rate in the Union in connection with the administration of anaesthetics during surgical operation unfortunately continues. Every such death is now immediately reported to the Department and all the circumstances under which it occurred are carefully enquired into, with a view to the possibility of measures being introduced which may tend to lessen the mortality.

In the accompanying table the deaths that occurred in connection with 40,860 operations carried out in the larger hospitals of the country during the year are analysed. Amongst these there occurred a total of 64 deaths, or 1.57 per 1,000 operations. Last year the rate was 1.26 and the year before that 1.90. There is therefore little sign of any improvement in the position.

TABLE Q.—DEATHS DUE TO ANAESTHETICS.

Anaesthetic.	Number of Operations.	Deaths on Table due to—					Per 1,000 Anaesthetics.
		Anaesthetic.	Anaesthetic and Shock.	Operation while Moribund.	Surgical Accident.	Total.	
Ethyl Chloride and Ether	10,663	4	15	10	2	31	2.91
Chloroform and Ether..	13,346	4	6	4	—	14	1.05
Gas and Oxygen.....	1,454	—	2	3	—	5	3.44
Ether.....	931	1	—	2	—	3	3.22
Chloroform.....	711	2	—	1	—	3	4.22
Spinal.....	455	—	1	—	—	1	2.20
Local.....	7,506	—	—	2	—	2	0.27
Ethyl Chloride.....	4,026	—	—	1	—	1	0.25
Avertin.....	495	1	3	—	—	4	8.08
Not specified.....	1,273	—	—	—	—	—	—
	40,860	12	27	23	2	64	1.57

A carefully prepared questionnaire has been drawn up in consultation with expert anaesthetists and pharmacists for the guidance of Medical Superintendents of hospitals in submitting reports on these deaths. When sufficient data have been collected it is proposed to appoint a committee of experts to investigate the whole subject of anaesthesia under South African conditions. Arrangements have also been made to have the anaesthetic used in each case analysed free of charge to the hospital where considered necessary. Some years must, however, elapse before sufficient information will have been collected to make a satisfactory examination of the whole matter possible.

16. *Adulteration or False Description of Food, Drugs and other Articles.*—The following table reflects the administrative measures taken during the year under the Food, Drugs and Disinfectants Act, No. 13 of 1929:—

TABLE R.—SAMPLES TAKEN FOR EXAMINATION OR ANALYSIS UNDER ACT NO. 13 OF 1929, DURING THE YEAR ENDED 30TH JUNE, 1934, AND THE RESULTS.

Place.	Total Taken.	No. Analysed or Examined.	No. found Adulterated or Incorrectly or Falsely Described.	Prosecutions.	Convictions.	Remarks.
Ports of Union.....	215	202	8	—	—	53 consignments detained pending re-labelling. 3 consignments re-shipped. 4 consignments destroyed.
Cape Province.....	2,214	2,167	561	155	127	
Natal Province.....	387	387	32	23	21	
Transvaal Province..	1,094	1,094	205	94	84	
Orange Free State Province.....	46	46	6	5	5	
TOTAL.....	3,956	3,896	812	277	237	

Imported Articles Dealt with at Ports of the Union (including Inland Customs' Ports of Entry).—This work is undertaken with the co-operation and assistance of the Department of Customs and Excise. A total of 202 samples (compared with 173 during the previous year) were analysed or examined. Of these 8 proved not to be up to standard, 72 warnings were issued on account of defective labelling, 53 consignments were released after re-labelling in customs, 3 consignments were re-shipped whilst 4 consignments were destroyed. Among the articles submitted for analysis were butter and cheese (65 samples), cream (9 samples), malt extract (38 samples), meat and fish products (14 samples), condensed milk (18 samples) and disinfectants (25 samples).

Sampling by Local Authorities.—To date 26 municipalities have been empowered in terms of section 2 (3) of the Act to undertake the sampling in their areas of perishable articles and also flour, meal, bread and other articles not packed or sold in sealed packages. During the year a total of 2,097 samples was analysed on behalf of these local authorities; 558 samples were found to be adulterated in respect of which 221 prosecutions were instituted resulting in 182 convictions and the infliction of fines totalling £407. 10s. The more important articles analysed included 1,657 milks (459 adulterated), 112 ice creams (51 adulterated), 39 butters (6 adulterated), 82 coffees and coffee mixtures (15 adulterated) and 87 meat and fish preparations (25 adulterated). The increase both in the number of samples analysed and the number found to be adulterated as compared with the previous year is to be explained by the activity of the Capetown Municipality in carrying out sampling in its area which accounted for the submission of 663 samples and the detection of adulteration in the case of 279. Under the arrangement in force each local authority is entitled to the examination or analysis, free of charge in a Government laboratory, of a number of samples annually calculated on the basis of four samples per thousand of the European population at the last census.

Sampling by the Department.—This is carried out in the smaller urban areas with the co-operation of the police and in the Johannesburg municipal area with the assistance of the Council's inspectors as regards milks sampled on Railway premises and such other articles as the Council does not itself deal with under the delegated powers mentioned in the preceding paragraph. Of the four inspectors employed by the Department one is stationed at Pretoria and serves the Transvaal and Orange Free State Provinces, one is stationed at Durban and does duty in the Natal Province and the remaining two are stationed at Capetown and carry out inspections in the Cape Province. Of a total of 1,644 samples submitted for analysis 246 were found to be adulterated, resulting in the institution of 56 prosecutions and the securing of 55 convictions. The more important articles analysed included:—

Food Articles.—Milks, 893 (130 adulterated); ice cream, 40 (31 adulterated); meat and fish, 30 (8 adulterated); mineral and aerated waters, 145 (15 adulterated); honey, 27 (5 adulterated); cheese and butter, 20 (9 adulterated); cocoa and chocolate, 19 (7 adulterated); coffees and mixtures thereof, 134 (12 adulterated); sauces and chutneys, 36 (8 adulterated); jam and canned fruit, 62 (none adulterated); flavouring essences, 25 (2 adulterated); meal and flour, 14 (none adulterated).

Soaps.—39 Samples were analysed and all found to be up to standard.

Drugs.—Of 35 samples analysed 4 were found to be below standard.

Disinfectants.—In addition to the 25 samples of imported disinfectants which were examined, 23 samples were purchased in the country; of the latter 6 were found to be below standard or not correctly labelled.

The question of the inferior quality of chocolate and chocolate coverings was the subject of a special investigation during the year following a complaint received that adulteration of chocolate was taking place through the abstraction of cocoa fat and the substitution of vegetable and animal fats. A number of samples of chocolate covering were obtained from manufacturers and while the resulting analyses showed that the fat was genuine cocoa butter a quantity of maize starch was found to be present in several samples as an ingredient in the article itself and not as a permitted dusting powder for the finished product. The attention of the firms concerned was accordingly drawn to the provisions of regulation No. 18 (6) under which the use of maize starch was not permitted and they were warned that the continued use of this substance would necessitate action being taken against them. The matter of the disclosure on the labels of confectionery of the name and business address of the manufacturer and also the ingredients used in the manufacture of the article was given close consideration at the time the Act first came into force but the conclusion was come to that owing to the majority of the labels being too small to permit of the information being printed on them it would be impracticable to insist on the disclosure being made. It was, however, definitely decided that the use of mealie meal (except as a dusting powder for the finished product) in confectionery, or in any article suggesting a kind or class of confectionery, could not be permitted.

General Warranties.—No new applications for the registration of general warranties, in terms of section 28 of the Act, were granted during the year. The total number of general warranties registered and in force is now 22.

Unsound Foodstuffs.—During the year several tins of fish which on examination were found to be badly blown were seized by an Inspector of this Department in country stores and were destroyed with the consent of the owners. Quantities of tinned foods were seized and condemned by the health staffs of local authorities during the year.

Port Health Officers were active in dealing with imported articles of food at the different ports of the Union. A large variety of articles including tomato puree, maple syrup, tinned oysters, crab meat, essences, fish, cucumbers, meat, cheese, olives, desiccated cocoanut and a consignment of preserved cherries valued at £53 were found to be unfit for consumption and destroyed.

General.—The Department's inspectors continued to undertake tours of inspection during the year, combining with their food and drugs work the inspection of poison registers which general dealers, having authority to sell poisons, are required to maintain in terms of the Medical, Dental and Pharmacy Act, No. 13 of 1928, as also habit-forming drug registers kept by chemists and druggists in terms of the same Act. These inspections revealed not a few irregularities which necessitated the issue of written warnings in a number of instances. Section 51 (4) of Act No. 13 of 1928 prohibits the issue of a certificate authorising the sale of patent, proprietary or "dutch" medicines containing poison to any dealer who carries on business in or within five miles of any municipality, town or village wherein a chemist and druggist is carrying on business. Complaints having been received that these preparations were being sold by general dealers within the prohibited area, a departmental circular was issued during November, 1933, in which Magistrates were requested, before issuing a certificate to enable a general or retail dealer to keep or sell such preparations, to assure themselves that a chemist or druggist was not carrying on business within five miles of the storekeeper's premises.

VII.—CONCLUSION.

I cannot conclude this report without a reference to the extent of the services rendered to the Government by Col. P. G. Stock, C.B., C.B.E., of the staff of the Ministry of Health, Whitehall, who has continued to act as the official representative of the Government on the International Health Office at Paris and as its unofficial liaison officer with the Ministry of Health in London. In the latter capacity he has been good enough to assist during the year the High Commissioner in London on behalf of the Department in a number of medical matters, particularly in connection with the selection of a Serologist for the Department, and, later, in arranging a course of further study in Europe for the officer selected prior to his assumption of duty in South Africa. Col. Stock has again furnished the Department with valuable reports on matters arising during the year from the sessions of the International Health Office. These reports have been greatly appreciated.

The Department has, as usual, again drawn freely during the year on the resources of the South African Institute for Medical Research which the Director has always placed at its disposal. The thanks of the Department are due to the Board of the Institute and to the Director and staff for their ever ready co-operation and assistance in connection with all questions affecting the public welfare.

Nor can I omit reference to the assistance received from Dr. P. J. du Toit and Dr. G. de Kock, the Director and Deputy Director of Veterinary Services respectively, and to Dr. Sinclair the Chief of the Division of Chemistry in the Department of Agriculture. These officers on every occasion on which their advice has been sought have freely placed their services at our disposal, and it is hoped that the closest possible liaison, which has now been established between the technical officers of the two Departments, will be continued.

The South African Medical Council and the South African Pharmacy Board have continued to render material assistance to the Department and my thanks are due to the Presidents and Members of those bodies and to Mr. E. Herbert, the Registrar, for the manner in which they have co-operated with the Department. Resumés of the work done during the year by these two bodies appear in Annexures G and H.

The Federal Council and the various Branch Councils of the Medical Association of South Africa have been helpful to the Department in a number of ways during the year. The policy of the Department is to encourage its professional officers to be active members of the Association and as far as possible to induce local authorities to consult freely with the local branches of the Association on matters affecting the medical profession. It seems to me almost essential for a medical officer of health to a local authority to belong to the local branch of the Association so that he may establish proper contact with the practitioners in his area. And it is noteworthy in this connection that the most successful medical officer of health is almost invariably an active member of the local branch, while the medical officer of health who is not a member of the Association rarely has that assistance from local practitioners which is necessary for success in public health work.

During the year a number of complaints by members of the public against district surgeons have been investigated. The majority of these have been due to misunderstandings on the part of the public in regard to the nature of the contracts of service and not to infringements of the terms of service. One serious complaint led to the dismissal by the Minister of the officer concerned, after independent investigation by a magistrate from another area.

Generally, the Government is fortunate in its district surgeons. Most of these officers have done, and are doing, extremely good work often under very difficult conditions at a low rate of remuneration. It is gratifying that funds have at last been provided to place the remuneration of these officers generally on a more satisfactory footing. My thanks are due to them for their patience in this matter and also to the District Surgeons' Association which has itself been able to sift many of the grievances of district surgeons arising from time to time—often from lack of knowledge of conditions generally applicable to the union—and to ensure that only genuine grievances have been forwarded with the backing of the Association. The Department is always prepared to consider carefully any proposal brought forward by the Association due regard being had of course to the interests of the general public.

I have referred in a previous section to the prolonged ill-health of Dr. Murray, the Senior Assistant Health Officer at Pretoria. His absence from duty has been sorely felt in the Department and has placed exceptional strain on the other professional officers, including myself. I cannot conclude this report without a reference to the extent of the services rendered in the public service by the officers of the Department—professional, clerical and lay. It is certain that were it not for the ungrudging spirit in which every man and woman of this office works and voluntarily performs duties often after office hours many of which do not fall properly to his or her share, the Department could not cope with its growing responsibilities.

Lastly, I have again to record my indebtedness to Dr. E. H. Cluver who has been responsible for much of the labour involved in the preparation of this report.

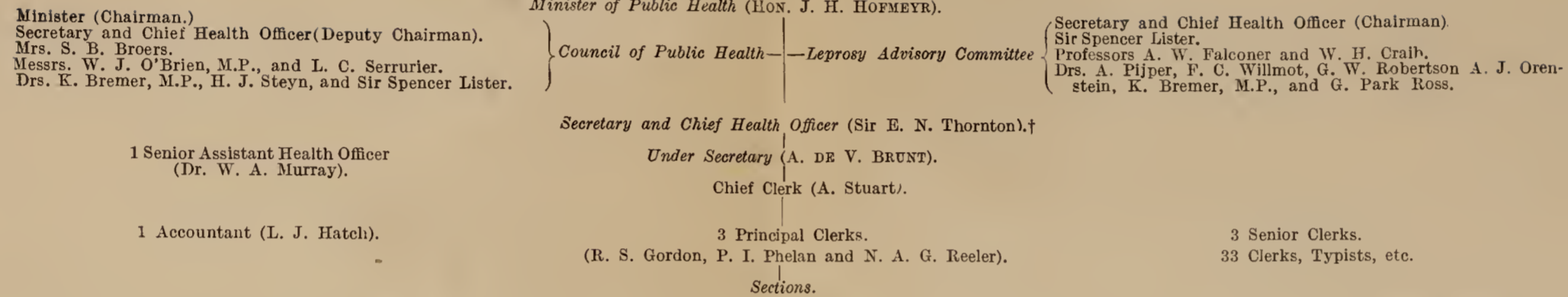
I have the honour to be,
Sir,
Your obedient Servant,

E. N. THORNTON,
*Secretary for Public Health and Chief Health
Officer.*

Department of Public Health,
Pretoria, 14th August, 1934.

ANNEXURE A.

CHART OF DEPARTMENT OF PUBLIC HEALTH as at 30th June, 1934.



Assistant Health Officers (Detached).	Inspection and Field Staff.	Maternity and Child Welfare.	Pathological Laboratories.	Port Health Officers.	District Surgeons.	Housing.	Leprosy Institutions.	Veneral Diseases Hospitals.	Malaria.	Tuberculosis.	Epidemic and Infectious Diseases (Plague, Typhus, Smallpox, etc.), and Vaccination.	Food and Drugs Adulteration; Habit-forming Drugs.	Local Authorities.	Other Bodies.
Capetown : (Dr. F. C. Willmot). Durban : (Dr. G. A. Park Ross and Dr. F. W. P. Cluver). Johannesburg : (Dr. L. Fourie).	Two Assistant Health Officers : (Drs. A. J. van der Spuy and E. H. Cluver). Five Inspectors (4 plague and 1 typhus).	Medical Inspector (Dr. M. Thomson). Nurse Lecturers.	Capetown, and Vaccine Institute, Rosebank : (Dr. W. F. Rhodes). Durban : (Dr. B. Sampson). *South African Institute for Medical Research, Johannesburg.	Capetown : (Dr. J. M. Bosman). Durban : (Dr. G. A. Batchelor). Port Elizabeth : (Dr. H. W. A. Kay). East London : (Dr. R. V. S. Stevenson). Simonstown : (Dr. A. B. Bull). Knysna : (Dr. J. D. Allen). Mossel Bay : (Dr. F. T. Waldron). Port St. Johns : (Dr. G. H. Meiring).	12 Whole-time. 3 Whole-time. (jointly). 318 Part-time. — 333 Total.	Central Board— Sir E. N. Thornton (Chairman), Sir J. G. van Boeschoten, Messrs. F. W. Jameson, J. L. Hall, R. S. Gordon (Member & Secretary)	Pretoria : (Drs. J. J. du Pré le Roux, H. v. R. Mostert, H. J. F. Wood, and J. C. Coetzee). *Elim. *Jane Furse Memorial. Several smaller hospitals.	Rietfontein, Johannesburg : (Dr. J. Daneel). Kingwilliamstown : *Bochem. *Elim. *Jane Furse Memorial. Several smaller hospitals.	Transvaal : Medical Inspector : (Dr. D. H. S. Annecke). Inspectors and Assistants. Natal : Medical Officer. (Dr. A. L. Ferguson).	Nelspoort Sanatorium : (Dr. P. Allan). *Holy Cross Medical Mission.	Field Staff. District Surgeons. Local Authorities. Magistrates, etc.	Inspectors, Customs, Police, etc. Chemical work done in chemical laboratories of Department of Agriculture at Capetown & Johannesburg.	229 Municipalities. 98 Village Management Boards. 39 Local Boards. 31 Village Councils. 54 Health Committees. 7 Local Administration and Health Boards. 94 Divisional Councils. 1 Health Board. 152 Magistrates. 5 Mining Commissioners. — 710 Total.	South African Medical Council, South African Pharmacy Board. Rand Water Board.

* Receives Grant-in-Aid.

† Is also Director of Medical Services (Defence).

ANNEXURE B.

Pamphlets and Leaflets published by Department of Public Health:—

- “ Senecio Disease.” (Warning Notice.) No. 166 (Health).
- “ Food and Health.” No. 194 (Health).
- “ Anthrax.” No. 239 (Health).
- “ Venereal Diseases: Their Prevention and Treatment.” No. 248 (Health).
- “ Instructions to Persons suffering from Gonorrhoea.” No. 249 (Health).
- “ Instructions to Persons suffering from Syphilis.” No. 250 (Health).
- “ Poisoning by ‘ Stinkblaar ’ or Thorn Apple (*Datura stramonium* and *Datura tatula*).” (Warning Notice.) No. 256 (Health).
- “ Sleeping Sickness.” (Warning Notice.) No. 262 (Health).
- “ Smallpox: Duties and Powers of Local Authorities under Public Health Act, and procedure to be followed in dealing with outbreaks.” No. 276 (Health).
- “ Directions for the Performance of Public Vaccination.” No. 279 (Health).
- “ Dagga Smoking and its Evils.” No. 289 (Health).
- “ Plague: A Brief Account of its Symptoms, Clinical Diagnosis, Morbid Anatomy and Treatment.” (Drs. D. C. Rees and J. A. Mitchell.) No. 293 (Health).
- “ Plague: Its Control, Eradication and Prevention.” No. 316 (Health).
- “ Plague and its Cause and Prevention.” No. 317 (Health).
- “ Rodents: Description, Habits, and Methods of Destruction.” (W. Powell.) No. 321 (Health).
- “ Fly-proof Latrines for Coloured Persons.” (Dr. G. A. Park Ross.) No. 334 (Health).
- “ Houseflies: Their Life-history, Destruction, and Prevention, and their Influence on Sanitation and Health.” No. 335 (Health).
- “ Bilharzia (Human Redwater) Disease.” No. 339 (Health).
- “ Snake-bite and its Treatment.” No. 348 (Health).
- “ Instructions to Native Patients suffering from Syphilis or Gonorrhoea.” (In Zulu, Sixosa, Sesuto, and Sechuana.) No. 358 (Health).
- “ Influenza.” No. 363 (Health).
- “ Typhoid or Enteric Fever: Its Causes, Spread and Prevention in South Africa.” No. 365 (Health).
- “ Care of the Teeth and Prevention of Dental Disease in Children.” No. 368 (Health).
- “ Leprosy in the Transkei.” No. 372 (Health).
- “ Catechism about Typhoid or Enteric Fever.” No. 378 (Health).
- “ The Teeth: How to Prevent Decay.” No. 379 (Health).
- “ Plague Danger in Cape and South-Western Districts: Measures and Procedure in Event of Outbreak.” No. 380 (Health).
- “ The Cause and Prevention of Simple Goitre.” No. 394 (Health).
- “ Typhus or Louse Fever.” No. 417 (Health).
- “ Consumption, its Causes, Prevention and Treatment.” No. 439 (Health).
- “ Malaria Catechism for use in Schools.” No. 360 (Health).
- “ Life History of the Malaria Parasite.” No. 464 (Health).
- “ Directions for the Prevention and Treatment of Malaria and Blackwater Fever.” No. 198 (Health).
- “ Malaria Control by Anti-Mosquito (Adult) Measures.” No. 465 (Health).
- “ The Control of Malaria by Larvicidal Methods.” No. 435 (Health).
- “ Truths about Cancer.” (Published jointly with the National Cancer Association of South Africa.) No. 473 (Health).

ANNEXURE C.

TABLE 1.—PORTS OF THE UNION: HEALTH MEASURES DURING THE YEAR ENDED 30TH JUNE, 1934.

Particulars.	Capetown.	Durban.	Port Elizabeth.	East London.	Mossel Bay.	Knysna.	Port St. Johns.	Simonstown.	Port Nolloth.	Total.
Vessels dealt with.....	930	1,279	700	581	247	13	18	70	56	3,894
Cases of infectious or communicable diseases dealt with.....	348	326	4	7	—	—	—	—	—	685
No. of Vessels involved.....	84	77	4	7	—	—	—	—	—	166
Disinfections—										
Vessels.....	30	6	3	—	—	—	—	—	—	39
Consignments second-hand clothing and other articles.....	27	21*	17	—	—	—	—	—	—	65
Bales of mixed articles.....	—	—	—	—	—	—	—	—	—	—
Deratizations under International Sanitary Convention—										
No. of Vessels Deratized and Certificates Issued	—	60	—	—	—	—	—	—	—	60
No. of Exemption Certificates Issued.....	7	35	—	—	—	—	—	—	—	42
Rats Destroyed on Vessels and on Shore.....	2,427	1,654	1,524	653	574	—	—	—	—	6,832

* In addition, the personal effects of 1,592 Indian passengers were disinfected.

ANNEXURE D.

REPORT ON MALARIA CONTROL: PONGOLA IRRIGATION WORKS:

By DR. D. H. S. ANNECKE, *Medical Inspector (Malaria), Union Department of Public Health, Tzaneen, to the Secretary for Public Health.*

I. INTRODUCTION.

The Department of Irrigation undertook to lay out a scheme for land settlement purposes and irrigation works, in the sub-tropical regions along the Pongola River.

It is well-known that this country is intensely malarious and bearing this in mind the Department of Irrigation consulted this Department. At your request I made a comprehensive report with recommendations in April, 1932. This meant that the Department of Irrigation had to institute careful and detailed measures to combat malaria, namely, suitable siting for camps, anti-adult, anti-larval, provision for tolerant labour, and hospitalization of the sick. In addition, an adequate staff had to be appointed to fulfil these requirements, namely, a resident medical officer, a health inspector, native "spotters", all of whom would have specialized training in the methods of malaria prevention, and adequate labour gangs. It was estimated that for this purpose a round sum of £1,500 to £2,000 had to be set aside out of the total sum allotted for expenditure of the works, for the preservation and maintenance of the health of the people. This worked out to be between 1 and 2 per cent. for health measures, of the sum allocated for these works. It is known as the Upper Pongola Scheme, lying west of the Rooi Rand. It is anticipated that the works will be completed by September, 1934, and will have taken two and a half years to build. The main canal is about forty-one miles in length and the total length of distributaries about forty-four miles. The total number of Europeans and natives employed varied from time to time for various reasons. The monthly average for Europeans for the period 1932-33 was 206, and for the period 1933-34, 193. For natives the monthly averages for the respective periods were 793 and 1,090.

II. TOPOGRAPHY.

The works are situated in the Pongola Valley about fifteen miles from Magut. A small portion of the irrigable land is in Natal, but the larger areas are in the Transvaal. Nine different camps at various places and distances from headquarters were erected during the period of construction. The work was carried out along broken undulating country and in an intensely malarious area, which is low-lying, the highest point being headquarters camp at an altitude of 1,100 feet above sea level.

The works comprise the following farms situated in the Districts of Piet Retief (Transvaal) and Ngotshe (Natal):—

Grootdraai No. 707, Nooitgedacht No. 620, Umgname No. 156, Koppie Alleen No. 157, Onverwacht No. 155, Rietspruit No. 158, Nooitgedacht No. 159, Wonderfontein No. 160, Punguin No. 161, Kunininggie No. 162, Salani No. 163, Sitilo No. 164.

III. METEOROLOGY.

Climate, sub-tropical. Summer rains, very little rain in winter.

Average Mean Monthly Temperatures.

METEOROLOGICAL READINGS.

	Mean Dry Bulb.		Mean Wet Bulb.		Mean Temperature.		Mean Temperature.		Rainfall.	
	Season 1932-33.	Season 1933-34.	Season 1932-33.	Season 1933-34.	Maximum Season 1932-33.	Maximum Season 1933-34.	Minimum Season 1932-33.	Minimum Season 1933-34.	Season 1932-33.	Season 1933-34.
July.....	—	58.95	—	54.10	—	74.72	—	54.52	—	0.79
August.....	—	61.63	—	55.69	—	77.45	—	55.39	—	0.03
September.....	—	65.82	—	59.22	—	81.87	—	57.54	—	0.295
October.....	—	69.73	—	60.44	—	84.92	—	60.63	Rain	1.45
November.....	—	72.16	—	66.03	—	82.80	—	64.65	Rain	5.47
December.....	—	71.24	—	67.29	—	83.97	—	63.60	Rain	6.59
January.....	74.77	76.55	68.25	66.11	86.75	85.04	67.25	70.54	3.24	6.66
February.....	75.66	72.69	68.6	66.71	88.6	85.26	68.8	65.80	3.985	0.41
March.....	73.6	73.13	67.7	68.01	88.5	85.05	67.2	65.95	0.98	2.09
April.....	69.3	70.72	63.8	65.76	83.0	83.97	62.3	63.36	2.32	1.39
May.....	64.9	65.80	58.8	59.32	81.6	81.35	58.5	58.60	Nil	0.91
June.....	58.8	—	51.5	—	79.5	—	54.06	—	0.25	—

Meteorological readings from January, 1933, only.

The general opinion of local farmers is that the past rainy season (i.e. second of anti-malaria operations on the works) has shown a higher than average rainfall.

IV. ORGANISATION.

The personnel of the Health section of the works consists of, Medical Officer, Sanitary Inspector, native spotters and native labour gang for general sanitary work and anti-malaria work carried out under supervision.

The Medical Officer and Sanitary Inspector received special training in anti-malaria work at the Research Station at Tzaneen prior to commencing duties at the above Works. This course lasted fourteen days.

A. *Malaria.*

At the outset suitable sites for camps were selected on high or rising ground and as far away from water as practicable. Anti-malaria measures on the Works and in the field were chiefly carried out by the Sanitary Inspector with his labour gang trained for such work as was given to them.

1. *Anti-adult* work consisted of all houses and compounds being mosquito-proofed, the regular use of mosquito nets, daily searches for adults in all sleeping quarters and the daily spraying with insecticide of all bedrooms and compounds.

2. *Anti-larval Work.*—Three trained native “ spotters ” collecting larvae and searching for fresh breeding places and catching adults in dwellings were employed. Weekly spraying of all breeding places with anti-malaria oil, within an area of $\frac{1}{2}$ mile, extending on findings to $\frac{3}{4}$ or even one mile. Draining of all places holding water capable of being so treated. The oiling was done by boys trained for the particular branch of the work.

3. *Malaria Patients.*—Blood smears were taken of all suspected cases and diagnosed microscopically.

4. *Tolerant Labour.*—A great endeavour was made to employ malaria tolerant (salted) labour. In this direction the Compound Manager was of invaluable aid having formerly been a Magistrate in these parts who was well known to natives for many miles around. After a while the natives themselves began to appreciate our requirements and during the second season at least 60 to 75 per cent. of the total native labour strength was tolerant to the disease. So much so that where other preventive measures proved impracticable, and too costly, this one measure alone was adopted.

B. *General Illnesses.*

At no time was the work held up through illness. All cases were of a general kind with practically no cases of infectious diseases. Most of the native cases were due to minor injuries received.

Two hospitals, one for Europeans (12 beds) and one for natives (16 beds) were established at Magut.

First Aid boys were stationed at various camps with the main First Aid Station at Headquarters where cases of a more serious nature were treated.

Periodical disinfection and fumigation were carried out. Cleaning of houses and compounds was done daily. Periodical disinfection and fumigation of native quarters keeping as low as possible the breeding of lice accounted for the absence of typhus fever and better work by the natives not being disturbed by lice during their sleeping hours. Deverminisation of all new recruits was efficiently carried out. No cases of typhus fever occurred on the Works during the above period.

V. MOSQUITOES.

Very careful records were kept throughout the period by the Health Inspector. A summary of this work is seen in the following tables which are self explanatory.

ANOPHELINE ADULTS: 1ST NOVEMBER, 1932 TO 30TH JUNE, 1933.

A.—Controlled Camps.											
	November.	December.	January.	February.	March.	April.	May.	June.	Totals.		
(1) Headquarters: European Quarters.....	—	Nil	G. 8 (tent).	G. 1	G. 1	G. 2 (tents)	Nil	G. 1	G. 13		
Native Quarters.....	—	G. 5	G. 10	G. 2	Nil	Nil	Nil	Nil	G. 17		
(2) White Labour Camp.....	—	G. 1	G. 3	G. 6	G. 6	G. 3	Nil	G. 1	G. 20		
(3) Koppie Alleen: European Quarters.....	—	Nil	G. 1	G. 1	Nil	Nil	Nil	Nil	G. 2		
Native Quarters.....	—	G. 7	G. 10	G. 2	Nil	G. 1	G. 5	Nil	G. 25		
TOTAL FOR (A) CONTROLLED CAMPS.....									G. 77		
B.—Uncontrolled Areas.											
Rouillard's Compound.....	—	G. 12	G. 73	G. 5	G. 19	G. 26	G. 7	Nil	G. 142		
Dwellings in vicinity of Scheme.....	—	—	G. 17	G. 81	G. 90	G. 179	G. 178	G. 148	G. 693		
Other Searches in District.....	One search at each house in the district was made giving a total of.....									G. 85	
TOTAL FOR UNCONTROLLED AREAS.....									G. 920		

ANOPHELINE LARVAE IDENTIFIED.

G. Gambiae.	Funestus.	Funestus var. Leesonii.	P. Pretoriensis.	Ardensis.	C. Cinereus.	L. Listeri.	M. Mauritanus.	Nili.	Rufipes.	Rhodesiensis.	Squamosus.	de Meillonii Transvaalensis.	Theileri.	Total.
559	6	211	395	4	68	15	84	9	80	16	9	59	29	1,544

A.—Controlled Camps.	To end November.	December.	January.	February.	March.	April.	May.	Total.							Total Anophel.
								G.	C.	L.	S.	P.	M.	T.	
(1) Headquarters. European Quarters..... Native Quarters..... U/Screened Outbuildings..... Rouillard's Compound.....	Nil Nil Nil	Nil G. 2 G. 12	G. 3 G. 5 G. 12	G. 1 Nil G. 2	Nil G. 2 G. 5	G. 1 G. 2 L. 1 G. 3	Nil Nil C. 1 G. 1	5 11 — 35	— — 2 —	— — 1 —	— — — —	— — — —	— — — —	— — — —	54
(2) White Labour Camp.....	G. 4	G. 2	G. 1	G. 4	G. 4	Nil	Nil	15	—	—	—	—	—	—	15
(3) Koppie Alleen. European Quarters..... Native Quarters..... Temporary G.P.O. Tents.....	Nil Nil —	G. 5 G. 4 G. 5	Nil Nil —	Nil Nil —	Nil G. 1 —	Nil Nil —	Nil Nil —	5 5 5	— — —	— — —	— — —	— — —	— — —	— — —	15
(4) Onverwacht. European Quarters..... Native Quarters (Labour)..... U/Screened Native Hut (Police).....	Nil G. 18 —	Nil G. 21 —	Nil G. 8 —	Nil G. 10 —	Nil G. 2 —	Nil Nil G. 3	Nil Nil C. 1; G. 2	— 59 5	— — 1	— — —	— — —	— — —	— — —	— — —	65
TOTAL FOR CONTROLLED CAMPS.....								145	3	1	—	—	—	—	149

B.—Uncontrolled Camps..... Weir..... Dwellings in vicinity of Scheme.....	C. 1 G. 41 —	G. 145 —	G. 569 —	G. 1438 —	P. 1 G. 546 —	M. 1; L. 2 S. 4 G. 441	T. 2; C. 2 M. 1; S. 4 G. 823	— 3 —	— 2 —	— 1 —	— 2 —	— 2 —	4,021
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ANOPHELINE LARVAE IDENTIFIED 1ST JULY, 1933 TO 31ST MAY, 1934.

G. Gambiae.	P. Funesius.	P. Funesius var. lesoni.	P. Pretoriensis.	Ardensis.	C. Cinerens.	L. Lasteri.	Longipalpis.	M. Mauritius.	Marshalli.	Maculipalpis.	Nil.	Natalensis.	Rufipes.	Rhodesiensis.	S. Squamosus.	Squam var. cydippis.	T. de Meillon.	Pheltri.	Total.
1,180	202	636	1,547	2	156	11	31	945	2	9	27	18	125	5	125	1	58	45	5,125

Notes on above Tables.

(1) It will be seen that Rouillard's Compound during the first season was uncontrolled by Works, that is anti-adult work was done by the owner. This however proved to be so haphazard and futile that during the second season it was incorporated under Works Control. Its situation was inimical to Headquarters Camp.

(2) About twelve farms were searched during the first season for mosquitoes. It was only necessary to search the European Quarters in each case.

(3) The only measure adopted here was the use of malaria tolerant labour.

VI. COSTS.

That malaria was completely controlled on these Works is evident. It is however of the greatest importance for the sake of future schemes in the sub-tropical regions to know the costs involved. The following is a statement in detail for each camp over the last season. This refers to anti-malaria services. Expenditure on general sanitation was kept separately.

SUMMARY OF COSTS; ANTI-MALARIA SERVICES.—1st JULY, 1933 to 31st MAY, 1934.			
	£	s. d.	£ s. d.
HEADQUARTERS CAMP.			
(1) <i>Native Spotter</i>			30 3 10
(2) <i>Anti-Larval Work</i> —			
(a) <i>Native Labour</i>	14	14 4	
(b) <i>Stores (mostly larvicide)</i>	22	7 6	
			37 1 10
(3) <i>Anti-Adult Work</i> —			
(a) <i>Native Labour</i>	7	6 9	
(b) <i>Stores (mostly insecticide)</i>	29	7 0	
			36 13 9
			103 19 5
WHITE LABOUR CAMP.			
(1) <i>Native Spotter</i>			10 10 5
(2) <i>Anti-Larval Work</i> —			
(a) <i>Native Labour</i>	11	11 10	
(b) <i>Stores (mostly larvicide)</i>	17	0 11	
			28 12 9
(3) <i>Anti-Adult Work</i> —			
(a) <i>Labour</i>		Nil	
(b) <i>Stores (mostly insecticide)</i>	30	1 2	
			30 1 2
			69 4 4
KOPPIE ALLEEN CAMP.			
(1) <i>Native Spotter</i>			16 8 0
(2) <i>Anti-Larval Work</i> —			
(a) <i>Native Labour</i>	11	11 9	
(b) <i>Stores (mostly larvicide)</i>	19	5 6	
			30 17 3
(3) <i>Anti-Adult Work</i> —			
(a) <i>Native Labour</i>	6	16 6	
(b) <i>Stores (mostly insecticide)</i>	29	3 5	
			35 19 11
			83 5 2
ONVERWACHT CAMP.			
(1) <i>Native Spotter</i>			28 19 8
(2) <i>Anti-Larval Work</i> —			
(a) <i>Native Labour</i>	11	12 0	
(b) <i>Stores (mostly larvicide)</i>	36	5 1	
			47 17 1
(3) <i>Anti-Adult Work</i> —			
(a) <i>Native Labour</i>	6	16 0	
(b) <i>Stores (mostly insecticide)</i>	31	12 9	
			38 8 9
(4) <i>Drainage (14 pans)</i> —			
(a) <i>European Wages</i>	14	0 0	
(b) <i>Native Labour</i>	26	15 6	
			40 15 6
			156 1 0
WEIR CAMP.			
(1) <i>Native Spotter</i>			10 7 3
(2) <i>Anti-Larval Work</i>			
Nil			
(3) <i>Anti-Adult Work</i> —			
(a) <i>Native Labour</i>	5	14 3	
(b) <i>Stores (mostly insecticide)</i>	19	6 11	
			25 1 2
			35 8 5
GENERAL.			
Scraping and levelling top Canal bank.....			23 11 0
Sanitary Inspector's Salary.....			275 0 0
<i>Mechanical Transport</i> —			
(a) <i>Running Expenses</i>	51	0 4	
(b) <i>Repairs</i>	20	1 1	
			71 1 5
			£817 10 9
TOTAL.....			
Previous Season (1/10/32 to 30/6/33) Headquarters, White Labour and Koppie Alleen only.....			
			785 17 6

REMARKS.—White Labour Camp spraying carried out as part of general handyman's duties, wages charged to general camp expenses.

GENERAL SANITATION.

Costs—

1st July, 1933, to 31st May, 1934 (8 camps).....	£750	1	11
1st October, 1932, to 30th June, 1933 (3 camps).....	700	8	3
			£1,450 10 2
Cost of Scheme for period 1/7/33 to 31/5/34.....	£84,828	13	0
% Anti-Malaria Services for period.....	.964%		
% General Sanitation for period.....	.884%		
Total cost of Scheme as at 31st May, 1934.....	£149,332	4	11
Total % Anti-Malaria Services.....	1.074%		
Total % General Sanitation.....	.969%		

MAJOR STORES DRAWN.

"Shell" Anti-Malarial Mixture.....	51 drums	(3,264 gallons).
Pyagra.....	—	(48 gallons).
Power-paraffin.....	25 drums	(1,100 gallons).

It will be seen that the total anti-malaria cost was in the neighbourhood of 1 per cent., while the total general sanitation was under 1 per cent., as at the 31st May. The costs of both services varied but little over the two seasons, in spite of the fact that during the second season the work had extended considerably (8 camps instead of 3). The rainfall was higher entailing more breeding places and exacting more work from the Field Staff. This evenness of expenditure may be attributed to improved organisation as time went on.

VII. OBSERVATIONS.

The mosquito vector responsible for transmitting malaria is *A. gambiae* which as we know breeds pre-eminently in shallow pools and puddles, exposed to sunlight and devoid of vegetation, spreading and increasing in numbers with rainfall. At selected spots, viz., grassy and shady edges of quietly running spruets, *A. funestus* was also found, though this species was never met as an adult in human habitations. Moreover the terrain was not altogether suitable for *A. funestus*. There is no doubt that *A. gambiae* can breed in prolific numbers in this area (see catches uncontrolled camps—in mosquito tables).

In order to control malaria on these works measures were instituted:—

1. *Against the mosquito*: (a) Larva, i.e., anti-larval; (b) Adult, i.e., anti-adult.
2. *Against the parasite*: (a) direct; (b) indirect.

We have discussed the Field Staff organisation against the mosquito. Briefly this consisted of the Health Inspector with his oiling gangs together with highly trained "spotters" whose duties it was to seek out new breeding places and test out the efficiency of work done by oiling gangs. Nothing less than daily insecticidal spraying was carried out in all the compounds throughout the Works. Research work at Tzaneen proved the futility and uselessness of anything less than this. During the second season this Unit was severely taxed, but good organisation and method enabled them to cope with the increased work brought about by higher rainfall.

2. (a) Direct measures against the parasite entailed an efficient line of treatment and hospitalisation of the sick. In this direction everything was kept in readiness in case a breakdown occurred with the Field Staff organisation. Adequate supplies of quinine were on hand, in order to institute symptomatic prophylaxis should the occasion have arisen. The standard treatment introduced on the South African Railways was to be used.

(b) All houses were mosquito-proofed and bednets issued to all Europeans on the Works except the actual labour strengths. After this the most important indirect measure adopted was the recruitment of malaria-tolerant (salted) labour. Great stress was laid on this aspect as a control measure, and every endeavour was made to recruit the largest possible proportion of this class of labour. This measure plus the trained Staff organisation to combat the mosquito really brought about success.

The incidence of malaria on the works was very low, as can be seen from the following tables:—

MALARIA ON WORKS, 1932-34.

	Date.	New Infections.	Relapses.	Total.	Total Population.
European.....	Oct., 1932, to 30th June, 1933.	6 or 1.2%	24 or 5%	30	477
European.....	30th June, 1933, to 30th June, 1934.....	11 or 1.8%	28 or 4.8%	39	582
Average.....	Oct., 1932, to 30th June, 1934.	9 or 1.5%	26 or 4.9%	35	520

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MALARIA ON WORKS, 1932-34.

	Date.	New Infections.	Relapse.	Total.	Total Population.
Natives.....	Oct., 1932, to 30th June, 1933..	4 or ·12%	49 or 1·5%	53	3,108
Natives.....	30th June, 1933, to 30th June, 1934.....	5 or ·11%	168 or 3·7%	173	4,536
Average.....	Oct., 1932, to 30th June, 1934..	5 or ·12%	109 or 2·6%	57	3,822

Treatment was relegated to the background because there were so few malaria-sick. Bearing in mind the physical state of the native labour as regards age and health, the percentage of illness was very small. Many of these natives arrived on the Works in a poor condition, but within two or three weeks were able to do the normal tasks required. Their diet consisted of mealie-meal, sprouted beans, meat and maheu being added once a week. There appeared to be no vitamin deficiency on this standard diet. It must be remembered that while performing their heavy task (5 cubic yards of digging per day) they were continually exposed to the sun's rays. During the second season when the Works was spread over an extensive area only one measure was in use at several camps, viz., the use of malaria tolerant labour and nothing else.

In these camps *A. gambiae* was caught in large numbers, e.g. in the second season the total number of *A. gambiae* caught in controlled camps was 149; whereas in uncontrolled camps the total was 4,021. (See again the mosquito tables; uncontrolled camps. Particularly the weir camp). At the weir 300-400 malaria tolerant natives were doing work at the height of the malaria season. Not a single other measure was instituted to protect them from the bites of *A. gambiae*. The work was never delayed, though of course the natives did complain at times of headaches or feeling out of sorts.

An attempt was made to use the population of farms surrounding the Works as a control to what was obtaining on the Works. The following tables are of some significance derived from visits to about twelve neighbouring farms.

MALARIA ON FARMS.

(1) 1932-33.

	New Infection.	Relapses.	Total.	Population (fixed).	Mosquitoes (1 search only).
(a) Europeans (11 dwellings)	21 or 24·6%	27 or 31·7%	48 or 56%	85	11
(b) Natives (10 huts).....	34 or 14·2%	85 or 36·1%	119 or 50%	238	74

(2) 1933-34.

	New Infection.	Relapses.	Total.	Population.	Infection Rate.
(a) Europeans....	11 or 37·9%	5 or 17·2%	16	29	55%

(b) A number of new infections and relapses with a few deaths occurred at native kraals adjoining the Works. The new infections were mostly due to the fact that highveld natives came to live there but were not employed by the Irrigation Department. It was impossible to obtain accurate statistics about these nomad natives.

Another incident set out below serves to show the intensity of the disease when uncontrolled:—

District Inspection: Farm Onverwacht, 25th May, 1933.

Farm Onverwacht adjoining farm Koppie Alleen. A certain farmer engaged 24 natives from Vryheid, about the end of April. Information was

received that 10 of these natives had malaria, one of whom had since recovered sufficiently to return home. Investigation revealed:—

Name.	Previous History of Malaria.	First Symptoms about.	Blood Slide.
Fat (?).....	None	25/5/33	+ ve
Tempubane.....	None	16/5/33	+ ve
Jacob.....	None	18/5/33	+ ve
Andrew.....	None	18/5/33	+ ve
Mbigo.....	None	25/5/33	+ ve
Mduma.....	None	19/5/33	+ ve
Manwele.....	None	16/5/33	Symptoms: Malaria Blood Negative.
Frans.....	None	22/5/33	+ ve
Johannes.....	None	12/5/33	+ ve
One absent.....	?	?	Symptoms: Malaria.

Dwelling.—Large open shed; unscreened; about 2 miles by road from No. 1 Camp.

Adults.—*A. gambiae* 3♀.

There is no doubt that success of malaria control on the works had its repercussions on the district farming community. After the first season's operations we were asked by the local Farmers' Association to explain and elucidate the methods employed. Two successive meetings were held and great enthusiasm prevailed. The farmers began to take notice and with the second season of malaria, instituted similar measures, particularly anti-adult, in their own homes.

During the first season malaria control operations ceased at the end of June and recommenced the beginning of November. Operations ceased the second season at the end of May and that is a month earlier, for the following reasons: It was observed from routine catching of adults in houses, particularly the weir camp, where no anti-malaria operations were in force, that adult catches began to diminish at the approach of June, and that this diminution increased considerably by the end of the month. It was therefore resolved to withhold all operations at the end of May, in the second season. That this was justified is reflected in the following table:—

Table Showing Mosquitoes Caught at the Weir between 1st May, 1934 and 15th June, 1934, together with corresponding period of last year.

Week ended.	Catch.	Date.	Catch.
(1) 5th May, 1934.....	G. 77	(1) 5th May, 1933.....	G. 33
(2) 12th May, 1934.....	G. 61	(2) 12th May, 1933.....	G. 1
(3) 19th May, 1934.....	G. 26	(3) 19th May, 1933.....	G. 50
(4) 26th May, 1934.....	G. 19	(4) 26th May, 1933.....	G. 38
(5) 2nd June, 1934.....	G. 16	(5) 1st June, 1933.....	G. 42
(6) 9th June, 1934.....	No search	(6) 8th June, 1933.....	G. 33
* (7) 16th June, 1934.....	Nil	(7) 15th June, 1933.....	G. 18
		(8) 22nd June, 1933.....	G. 5
		(9) 29th June, 1933.....	G. 3
REMARKS.		REMARKS.	
All catches made by native Spotter, except (7) which was made by Sanitary Inspector. *(7) Four native huts.		(1) to (6) One native tent housing 5 natives. (2) Search made after spraying with insecticide. (7) and (8) Ten native huts, one tent. (9) Five native huts, one tent. All catches made by Sanitary Inspector.	

This is certainly a valuable piece of information and is worthy of further research, more particularly with what obtains in the malaria regions south of Pongola, and along the North Coast.

Another interesting observation was the fact that *A. gambia* was found breeding in quite large numbers in certain artificial containers, particularly the "drops", which are really cement troughs, situated along the distributary canals. Reasonable explanation—but at the same time only tentative and pending further investigation—seems to be that where all natural breeding places are made unsuitable by oiling, a gravid female chooses to deposit her eggs on such unnatural water surfaces rather than lose them. Moreover in this particular incident these "drops" were not functioning at all.

VIII. TREATMENT.

Just a word about treatment. As pointed out in the preceding paragraph, there were practically no malaria-sick, and as time went on it was felt that the organisation made in this branch could be considerably curtailed. It was decided then to treat most cases as occurred among the Europeans with the new drug Atebrin combining it with Plasmoguin. The following table summarises the results:—

	New Infections.	Old Infections.	Total.
Initial.....	11	28	39
Relapses.....	3	3	6 or 15·3%

The above cases only received Atebrin combined with Plasmoguin for five days which in our opinion is inadequate.

IX. CONCLUSIONS.

1. Malaria was controlled by the Department of Irrigation in an intense malaria area where *A. gambiae* was the mosquito vector.

2. (a) All practical measures of control were instituted, viz., anti-adult, anti-larval and protection measures.

(b) Trained malaria Staff employed.

(c) Fullest use made of malaria tolerant labour which proved an unqualified success.

3. Efficient organisation also maintained against incidence of general diseases and accidents.

4. Incidence of malaria negligible.

5. Costs of such organisation never rose above 1 per cent. of the total cost of the Works.

6. Success achieved stimulated local interests to adopt similar measures.

ACKNOWLEDGMENTS.

We feel greatly indebted to the Director of Irrigation and his Staff for the interest shown and assistance given to those employed on all matters appertaining to the health of the Works: Nothing proved to be too much trouble for the Resident Engineer, who on many occasions went out of his way to ensure that all recommendations were being carried out in detail. Above all he was thoroughly malaria-minded.

Dr. M. A. Lombard shouldered his responsibility admirably and kept the Health Unit running smoothly.

A special word of praise is due to Health Inspector P. H. S. Chalmers, who, so magnificently carried out and controlled the arduous field work. His unflinching zeal and unswerving loyalty to duty, contributed in no small way to the success of this Scheme.

ANNEXURE E.

Annual Report on the South African Railways and Harbours Health Organisation, 1933-34, by DR. C. G. BOOKER, Railway Health Officer.

Organisation.—Since my last Annual Report was written I was requested to organise the Administration's anti-rodent campaign. The Railway rat-catchers and the anti-malaria staff were assembled in Johannesburg and the combined staff was instructed in rodent and plague duties. After completion of the course of training the men were returned mainly to their previous depots, but a few transfers were effected and the sections reallocated so as to cover practically all Systems on the South African Railways. The various Systems were then visited, their most urgent requirements examined and rodent measures on uniform lines established throughout the four Provinces and South West Africa. The approach of the malaria season interrupted detailed examination and organisation.

At present then two independent organisations exist—one dealing with malaria the other entirely with rodents. The anti-malaria section is much younger but, by virtue of the more careful selection of its members, their wider, and more intensive training, as well as the closer supervision provided under the organisation, is the more efficient and reliable section.

From the commencement of the anti-malaria campaign, it was realised that malaria, plague, and other communicable diseases were intimately associated with personal, domestic and communal hygiene, and sanitary foremen were therefore encouraged to make themselves familiar with the various branches of sanitary science. Thus, the malaria section of the staff is being, or has been trained in rodent and plague work, general sanitation, fumigation, the protection of domestic water supplies, etc., and under the close supervision of the Assistant Engineer (Drainage and Sanitation) in Natal and the Sanitary Inspector in the Transvaal is beginning to take charge of these matters on the sections on which it operates. Aided to a great extent by the experience gained, a number of the staff have secured the certificate of the Royal Sanitary Institute and some others are eligible for the examination.

In furtherance of the work as a whole, recommendations have been put forward for the regrading of the Health staff as one unit. If agreed to these proposals will involve the elimination of such men of the rat-catching class as are quite unsuitable for this work and their gradual replacement by a good type of youth selected from the ranks of European labourers. It is proposed that these men by being gradually introduced to the less important health duties, will be allowed to graduate by training and experience through the various grades of the work. At each step more important duties and grading will serve as encouragement to further progress. The progress will be from Learner Sanitary Foreman, through two grades of Sanitary Foreman to Sanitary Inspector. The senior post for each province is a Health Inspector.

The final aim is an organisation consisting in each province of a qualified Health Inspector experienced in all branches of health work and under his control, instead of a number of rat-catchers, a staff of Sanitary Foremen. According to the locality some members of this staff will specialise in mosquito and malaria work and others in rodent and plague work, but all men in the higher grades will be qualified in both branches of this work, typhus fever, fumigation, and in the general routine of sanitation—the whole unit being co-ordinated with the Railway Medical Service. By virtue of its general training the organisation will be elastic and mobile and capable of concentration at any requisite spot.

To a limited extent the above organisation is already in operation in Natal and in the Eastern Transvaal. The other Systems still have rat-catchers and although some of these men have considerable experience and have had instruction in rodent work, they were originally appointed without regard to the wide implications of the rodent problem in this country. They are mostly middle aged men who suffer from severe limitations on account of low educational qualifications and most of them will never become sufficiently acquainted with this work or with other branches of health work to be able to take an active part in the proposed organisation. In fact it has been difficult for them to grasp the technical details of the subject and its important relation to international health. Some of them who have shown reasonable interest in health work have been given an opportunity to obtain malaria training, etc., and are doing well on the Natal Main line, Cape Northern and South West Africa; a number who have proved quite unsuitable have been placed on other duties and were replaced by younger men selected from the ranks of European labourers.

It is realised that even the malaria section of the organisation is far from complete and although defects are eliminated as they appear, and improvements introduced *pari passu* with development, a great deal more training and experience is required before the degree of efficiency which is aimed at can be reached.

Malaria Control:

I. *Malaria Control Sections.*—By careful analysis of the distribution of new infections and breeding of vectors in past seasons, malaria sections have been allocated to Sanitary Foremen. From time to time the sections have been altered in length in accordance with the seasonal requirements.

During the 1934 malaria season the Transvaal had 4, and Natal 8, organised malaria sections, covering a total of 1,286 miles and protecting a total of 6,946 Europeans and 5,851 non-Europeans at 129 stations, and 61 gangers' cottages.

II. *Policy: General.*—The Administration's anti-malaria policy remains unchanged and is briefly summarised as follows:—

Summary: Anti-Malaria Policy.

1. *Eradication of mosquito breeding places by permanent methods:*
 - (a) Draining.
 - (b) Reclamation.
 - (c) Absorption by tree planting.
 - (d) Fencing to prevent hoofprint-formation and restoring vegetation.

2. *Eradication of Mosquito by temporary methods*:
 - (a) Larvicides: Oil, Paris Green.
 - (b) Insecticides: Pyagra, Pyefly.
3. *Separation of Susceptible host from the infective mosquito*:
 - (a) Efficient gauzing.
 - (b) Selection of sites for new houses.
 - (c) Separation of carriers by gauzing or site selection.
4. *Medical*:
 - (a) Accurate diagnosis by blood smears.
 - (b) Prevention of relapses by efficient treatment.
 - (c) Adequate distribution of reserve supply of drugs in case of need.
5. *Propaganda*:
 - (a) Maintenance of gauze and bednets.
 - (b) Insecticide spraying.
 - (c) General home cleanliness.

III. *Larvicidal Work*.—The policy pursued was to keep up careful larval surveys until *A. gambiae* were collected. Once collected, larvicidal operations were carried out at weekly intervals and continued till the end of the breeding season. The staff kept in constant touch with the adjoining local authorities for the purpose of ascertaining their findings and checking their results.

At places like Durban, Stanger and Louis Trichardt, the local and the South African Railways and Harbours staff worked side by side; at places like Pietermaritzburg, Maidstone and Verulam the Administration supplied anti-malaria oil to be used by the outside authority on Railway property and at places like Letaba the Administration's anti-malaria staff supplied both labour and material—the outside authority refunding half the net costs. With the exception of some of the minor controlling authorities whose work proved entirely undependable all these systems worked well.

IV. *Permanent Work*.—Consistent with economy the policy pursued was to eradicate, by permanent measures, as many breeding places as possible, and not to recommend the expenditure of funds on drainage, etc., until the places in question were obviously dangerous or were actually incriminated by locating vectors in them.

V. *Insecticidal Work*.—Very good results were obtained with supervised insecticidal work during the 1933 season at Wentworth and other places. As a direct result it was decided to extend the scale of supervised insecticidal spraying during the 1934 season to the North Coast, and later to the Eastern Transvaal. The exact nature of the innovation was to provide the Sanitary Foreman with high pressure spray pumps and to establish a routine system of insecticidal spraying indoors under European supervision. Thus during the height of the season larvicidal and insecticidal spraying were being carried out side by side in areas where breeding was intense and extensive and every single member of the sanitation staff in these areas was absorbed by malarial work. This system of dual spraying gave such excellent results in Natal that its adoption as a routine method is contemplated in preference to leaving domestic spraying to individual tenants—which has proved unreliable.

VI. *Measures on adjoining Private Property*.—The anti-malaria staff has no authority on adjoining private property other than the right of inspection and report to the local authority concerned or to the Union Health Department. It is, however, fully aware of the fact that the Railway health may suffer very severely as a result of neglect on such property and the closest co-operation with local authorities and the Union Health Department is therefore maintained.

VII. *Relation of R.M.O.'s to Malaria Work*.—The total amount of malaria in a district is composed of new infections plus relapses. The field staff is concerned entirely with the former and the Railway Medical Service almost entirely with the latter. It is pleasant to note that the Medical Service is very wide awake to the important part it plays in malaria prevention. The number of relapses has been greatly reduced on the railways and a keen spirit of competition exists between this service and the field staff as to whether given cases are relapses or reinfections.

VIII. *Site Selection*.—This may be a very important factor particularly where quarters are concerned. The site for the new station at Kunzini was chosen with this principle in view. The native barracks have been located 32 chains from the European Quarters.

At Ingane River another striking example of the value of site selection is afforded. Shifted from an unhealthy spot to a more suitable site, a considerable improvement in the health of the Europeans employed on the bridge and deviation was made.

Malaria Incidence.—The following table shews the total malaria incidence in Natal and in the Transvaal during 1932, 1933 and 1934:—

RECORD OF NUMBER OF MEN GOING OFF DUTY WITH MALARIA.

Year.	Month.	Number on South Coast.	Number on North Coast.	Number in rest of Natal.	Number in Transvaal.	Total No.
1932	January.....	0	3	14	24	41
	February.....	2	9	4	22	37
	March.....	1	8	7	21	37
	April.....	6	38	44	40	128
	May.....	5	90	179	31	305
	June.....	11	80	162	21	274
	July.....	4	53	66	7	130
	August.....	3	21	28	3	55
	September.....	0	10	23	4	37
	October.....	1	21	31	2	55
	November.....	0	11	21	21	53
	December.....	3	12	30	3	48
1933	January.....	4	2	13	6	25
	February.....	2	7	22	7	38
	March.....	1	13	44	23	81
	April.....	0	9	25	6	40
	May.....	1	4	15	8	28
	June.....	2	3	19	3	27
	July.....	—	—	5	6	11
	August.....	—	—	16	1	17
	September.....	—	—	8	1	9
	October.....	—	—	11	4	16
	November.....	—	—	8	1	9
	December.....	—	7	4	4	15
1934	January.....	—	1	7	13	21
	February.....	—	3	6	18	27
	March.....	—	6	8	14	28
	April.....	—	9	17	7	33
	May.....	—	5	26	4	35
	June.....	—	9	20	1	30

From a control point of view the problem of malaria incidence divides itself into three phases:—

- (i) Places where infection is certain and rigorous control measures have to be adopted for a defined period each year.

The issue here is clear-cut and the only difficulties which may arise are of a topographical nature.

- (ii) Places where malaria may occur but where regular control may not be advisable because—

(a) the population is too small to justify it, e.g. Franklin, where one case occurred this season;

(b) malaria appears at irregular intervals, e.g. Pietersburg line.

Careful judgment has to be exercised in these cases in recommending or withholding control. The best solution is the part-time malaria Sanitary Foreman.

- (iii) Places where Railway control measures cannot protect the Railway population because employees have their places of residence scattered throughout the town.

This presents a very difficult problem. There are two important places in the Union where this has to be faced—Durban and Pietermaritzburg.

A summary of the figures shewing the incidence of railway malaria in these towns for the months January to June, 1934 (inclusive), are given below together with the figures for the same period in 1933:—

Month and Year.	Durban.	Pietermaritzburg.	Rest of Natal.	Total.
1934:				
January.....	5	—	3	8
February.....	3	—	6	9
March.....	4	3	7	14
April.....	7	2	17	26
May.....	15	5	11	31
June.....	13	5	11	29
TOTAL: January to June, 1934..	47	15	55	117
Total for same period, 1933.....	46	23	118	187

Thus in 1934, these two centres together accounted for 62 out of 117 cases, i.e. 53 per cent. of the total malaria in Natal, and Durban alone for 40 per cent. It will be noted that whilst the cases for the rest of Natal have dropped from 118 in 1933 to 55 in 1934 (52 per cent.), and Pietermaritzburg from 23 to 15 (35 per cent.), those for Durban shew no reduction. Further at Wentworth, where railway employees are concentrated in a railway controlled area within the Borough, there was a complete absence of malaria, although in 1932, 75 per cent. of this population is said to have suffered from malaria.

A still further example of the advantage of railwaymen being resident in a place where the railway malaria organisation can give full protection, is the fact that at Stanger only 7 men were booked off with malaria during the present season; all of them resided in private houses away from railway premises. Of the residents in railway quarters at Stanger, not one case occurred during the period in question. In the Transvaal 35 per cent. of the total malaria occurred in private houses where complete protection was not possible.

Quarters.—Throughout the various controlled areas it is observed that a considerable shortage exists in suitable accommodation for single men. This applies particularly on the Natal System. At certain places wood and iron quarters exists for single men which are very far from suitable in such areas. The result is that single men in most cases prefer to reside away from Railway property and it is impossible to give them the benefit of anti-malaria measures. Where the Administration has erected Hostels for such men they have been very much appreciated. It is considered that there is room for improvement in such quarters at Stanger and Gingindhlovu.

Durban Areas.—In my last report I dealt at some length with the situation in the Borough area of Durban, and made certain observations on the chief areas of weakness within the Borough. During the recent malaria season, the Administration was approached by the Borough Health Authorities with a proposal to unify malaria control within its boundaries. A meeting took place in Durban between representatives of the Administration and the Corporation, after which the question was left for discussion between the Health officers of the two authorities.

The Borough officers made the plea that their organisation was handicapped by the presence of numerous infective "islands" consisting of Government-owned land within the large area under its jurisdiction, and that unless these boundaries were swept away by the handing over of the Government land to the Corporation for malaria control small success could be achieved in the wiping out of vectors within the Borough.

From past experience of the railway organisation, there is nothing to indicate that advantage was to be gained by disbanding the railway organisation within the Borough and giving the Corporation jurisdiction over our land. In order, however, that it could not be said that the Administration was not prepared to co-operate in the combined efforts in Durban, the System Manager, Durban, submitted to the Corporation a proposal, the substance of which is as follows:—

That as the total area of the Administration's property scattered within the Borough equals approximately 2 square miles, the Corporation should agree to the Administration taking over the control of an equal area of Borough property in the vicinity of Wentworth, Booth, and Point (this being where the Administration owns the most railway quarters), thus concentrating the whole area under its control, whilst for its part and as a *quid pro quo* the Corporation should take control for malaria purposes, of all other railway land in the Borough, and thereby in so far as railway land is concerned, do away with the "islands" objected to.

Although the proposal was put to the Corporation two months ago, no further communication as to the decision arrived at by the Council, has been received.

Malaria Incidence and Rainfall.—The following table shews the *A. gambiae* catches and the average Natal rainfall during the 1933-34 malaria season:—

Year.	Month.	<i>A. gambiae</i> larvae.	<i>A. gambiae</i> adults.	Rainfall (inches).
1933	July.....	—	—	1·19
	August.....	10	—	·58
	September.....	7	—	1·78
	October.....	—	—	2·07
	November.....	—	—	7·18
	December.....	39	12	4·47
1934	January.....	124	47	6·75
	February.....	101	37	4·4
	March.....	112	59	3·86
	April.....	63	43	4·83
	May.....	56	50	1·00

The breeding of *A. gambiae* depends largely on the rainfall during the periods of sustained high mean temperature. A significant factor in the relation between rainfall and breeding is that the drainage table of the coastal belt appears to be able to absorb a rainfall up to 4 inches in any one month. Any rainfall in excess of 4 inches remains above the surface and forms pools and seepages ideal for *gambiae* breeding.

The following table compares 1933 with 1934 catches of *anopheline gambiae* and *funestus* and indicates that Sanitary Foremen are becoming more experienced in tracing breeding places:—

	<i>Gambiae.</i>		<i>Funestus.</i>		Total.
	Adult.	Larvae.	Adult.	Larvae.	
TOTAL: January to June, 1933.....	213	1,162	4	33	1,412
TOTAL: January to June, 1934.....	722	1,107	39	34	1,902

New Features.

The principal new features introduced during the present malaria season are:—

(i) *Introduction of Sanitary Inspectors.*—Previous to the present (1934) malaria season Sanitary Inspectors were not available and field work was carried out under my personal supervision. By the end of the 1933 season three Sanitary Foremen had obtained the Royal Sanitary Institute Certificate and Sanitary Foreman Robertson who had previously served his time as Pupil Engineer was promoted to Assistant Engineer (Drainage and Sanitation). His duties included the supervision of Sanitary Foremen in Natal. The satisfactory solution of Health problems constantly requires both medical and engineering skill; in this connection, the appointment of the Assistant Engineer (Drainage and Sanitation) has been sound policy. This officer has already rendered invaluable service, not only in connection with drainage problems in malaria areas but also in connection with problems of domestic water supplies and general sanitation elsewhere in the Union. By special examination and with an intimate previous knowledge of the men, Sanitary Foreman Botha was promoted to Sanitary Inspector for the Transvaal.

The present malaria season is therefore the first which was worked with the full complement of staff as recommended by the Inter-departmental Malaria Committee. In spite of the fact that each of these two supervisory officers was intimately acquainted with only one section of his System and that rainfall and breeding conditions were exceptionally heavy—the results have been very satisfactory. On two sections—Durban to Port Shepstone and Beit Bridge to Zoekmakaar—not a single case of malaria occurred. The only place where control measures failed was at Waterval Boven but the success at such places as Stanger, Komatipoort, Letaba, Tzaneen, Mara and Waterpoort—all hot beds of malaria—compensates to a certain extent for this failure.

The failure at Waterval Boven has caused a great deal of investigation. This station is not situated in a "climatic" area and it is generally assumed that residents do not contract malaria there. For these reasons the Inter-departmental Malaria Committee did not recommend control measures at this point. In spite of this, protection was provided from the beginning of the campaign. The adverse conditions this year necessitated anti-larval operations at most stations being extended to beyond the recommended half-mile radius. The extended control was not carried out at Waterval Boven and whilst this definitely accounts for the breakdown at this station, it serves as an example indicating the extent the disease might reach in a bad epidemic season if control measures were not effected.

(ii) *The Extension of Malaria Control to Other Sections.*—The campaign set out primarily to control malaria in the coastal belt of Natal and in the low veld of the North and Eastern Transvaal. Previous to the present malaria season the activities of the staff were limited to this particular work and to these areas.

During 1932 and 1933 malaria seasons careful surveys were made of the distribution of new infections and of malaria generally. In accordance with such surveys control measures were extended to other stations where this was warranted.

The object has been to reduce malaria to manageable proportions and not to eradicate it throughout the length and breadth of a System. The latter would be far too costly. For example, this season one infection

occurred at Franklin, but it would be impracticable to include this station in a Sanitary Foreman's district unless other stations close at hand required protection. (The minimum number of employees protected per Sanitary Foreman is estimated at about 100). The present system is well balanced and can provide intelligent protection where this is most needed.

Careful anopheline surveys are kept up on adjoining unprotected sections with the object of establishing control as soon as vectors appear. For example conditions this year rendered epidemic malaria on the Pretoria-Pietersburg section possible. An emergency supply of oil was, therefore, kept at Pietersburg. In February *A. gambiae* larvae appeared in the Potgietersrust district and in March at Naboomspruit. Control measures were then commenced and later breeding was located at several other stations along this line. It is not proposed to recommend control measures on such sections every year, but it is essential that the Sanitary Foreman responsible for other health work there, be able to detect breeding at its commencement and deal with it.

The same remarks apply to stations on the Natal Main Line, Cape Northern and S.W. Africa. Ratcatchers stationed on these lines have had the necessary malaria training and have done very useful anti-malaria work this season.

(iii) *Sanitary Foreman in Relation to other Health Duties.*—From the commencement of the campaign Sanitary Foremen have steadily made themselves familiar with the general routine of Railway hygiene. Correspondence courses have been arranged through the Pietermaritzburg Technical College at the small fee of £3. 15s. for instruction to enable men to qualify for the R.S.I. certificate. Their knowledge and experience in health matters are rapidly improving. In Natal and to a limited extent in the Eastern Transvaal the staff already deals with and is entirely responsible for such matters as malaria, plague, typhus, domestic water supplies, sanitation, fumigation, etc. Within the next few months it is proposed to organise the whole Transvaal and to some extent the Orange Free State and South West Africa on similar lines and to link up the other Systems as staff become available. Meantime and pending the appointment of additional Sanitary Inspectors to new areas, Works Inspectors and P.W.I.'s have been instructed to take an interest in regard to the proper disposal of waste matters and household refuse, the keeping of animals and cleanliness generally. Arrangements have been made with the Railway Chemist at Salt River for the quarterly bacteriological investigation of all railway domestic water supplies and samples will be taken by Works Inspectors and P.W.I.'s. Reports of such water will be forwarded direct to the Railway Health Officer. This survey is calculated not only to detect present unsuspected defects, but also those which may arise from time to time, and so allow of their immediate correction before serious harm results.

ANTI-RODENT MEASURES.

Organisation.—The retention of a staff whose duties are entirely concerned with rodent destruction is not justified on the Railways.

The anti-rodent and anti-malaria organisation is outlined at the beginning of this report and the aim of the organisation as one health unit is briefly indicated.

Policy.—The principle underlying all modern anti-rodent campaigns is not to concentrate on their destruction only. They are so prolific that this would be an endless task and no appreciable impression could be made on their numbers in this way. For any campaign to be successful it is essential to interfere with the normal life processes of the rat. Our houses and outhouses provide the necessary food and shelter for continuous multiplication. If either or both these factors were reduced by rat-proofing, there would be a corresponding reduction of the numbers and sizes of litters in each succeeding generation. This process steadily repeated through many generations combined with a programme of moderate but constant extermination is the only hope against this menace.

Rat-proofing.—This aims at preventing ingress to rodents and at eliminating harbourages and breeding places inside buildings by rendering ridge cavities, under-floor spaces, etc., inaccessible to rats. If under these circumstances rodents gain accidental admission in bales of goods, etc., instead of producing litter after litter of young, they will be compelled to quit at the first opportunity by thirst and lack of shelter. Once outside re-admission would be impossible and strange environment and natural enemies will take heavy toll of these animals.

Sheds provided with impermeable concrete or asphalt floors are very simple and inexpensive to render completely rat-proof. A large number of railway sheds are already provided with such floors and at small cost these buildings can be completed in this respect. Once this is done the field staff will be responsible for their maintenance and the work of extermination will be lightened to such a degree that longer sections and more time for other health work will be possible.

The field staff have been instructed in this work. With a view to efficiency and uniformity detailed instructions and blue prints have been issued to all Works Inspectors in this regard. Excellent progress has already been made in parts of the Orange Free State and Natal Systems and although very little efficient work has been done on other Systems, this matter has been stressed at both the System Managers' and Works Inspectors' Conferences and provision is now being made for it to go forward.

It is not intended to recommend rat-proofing for railway sheds irrespective of traffic or local rodent and plague conditions. But every shed in a plague infected district or within 20-25 miles of our ports and larger centres should receive early attention because the accidental transportation of infected rats by rail is a very simple matter. Later this programme might be extended to more remote areas.

In rodent as in anti-malaria work, the closest co-operation is maintained between the Union Health Department and the Administration. Not only have proofing measures been forced on adjacent owners at places where the railway work had been completed but where railway Inspectors have not yet been appointed Rodent Inspectors of the Union Health Department have been assisting in the supervision of the Administration's anti-rodent staff.

70 Railway buildings have been rendered completely rat-proof and repairs, improvements and partial proofing were carried out on some 50 others during the present year. Rodent-proofing measures are now being forced on 25 owners of 57 sheds on and adjacent to railway property.

Stacking of Goods in Sheds.—The proper storing of station records in rat-proof cupboards and the proper stacking of goods on dunnage and away from walls not only eliminate rat harbourages, but greatly facilitate disinfestation and it is here where Station Masters and District Inspectors can help this work tremendously. Instructions have been issued in this respect but have met with indifferent response.

Rat Extermination.—As indicated above the structural condition of buildings is the most important factor in a rodent campaign. The present condition of sheds is such that they do not assist in rat elimination and until they can take their proper place in this programme the only alternative is to relieve conditions by concentrating on rodent destruction. This is done principally by pumping cyanogas into burrows, under-floor spaces and other harbourages, but traps, poisoned grain, etc., are also resorted to.

25,548 Rodents were destroyed by trapping this year. Probably many times this number were destroyed by gassing and poison. The numbers destroyed are so insignificant in relation to the total rat population that it cannot be claimed that conspicuous progress is being made. This illustrates the force of the contention that protection rather than complete extermination is the soundest policy and the most economical in the long run.

I cannot conclude my report without recording my appreciation of the assistance rendered the organisation by officers and staff throughout the Systems. I realise that little could have been accomplished without this help. At the same time the future results of the organisation depend to the same great extent on the co-operation of the various departments, and as a larger sphere of the work is entered upon I trust the same measure of support will be continued.

ANNEXURE F.

TABLE 2.—VACCINATION OF INFANTS AND CHILDREN IN THE CLASSES OF THE POPULATION WHICH REGISTER BIRTHS, YEAR ENDED 30TH JUNE, 1934.
(These figures do not include Re-vaccination of the 12-year old Children.)

Particulars.	Cape.		Transvaal.		Natal.			Orange Free State.	Union.
	Cape District.	Remainder of Province.	Rand Area.	Remainder of Province.	Durban.	Pietermaritzburg.	Remainder of Province.		
Births Entered in Vaccination Register.....	12,893	35,510	9,533	11,031	2,124	686	1,689	4,668	78,134
Successfully Vaccinated.....	4,936	2,351	3,752	5,676	1,306	454	1,517	3,195	23,187
Insusceptible to Vaccination.....	14	2	26	34	44	12	24	38	194
Vaccination Postponed owing to Illness.....	349	121	384	453	429	98	546	1,261	3,641
Previously had Smallpox.....	—	—	—	—	—	—	—	1	1
Deaths of Infants under Two Years Registered.....	3,021	3,422	812	700	181	47	335	292	8,810
Exempted under Section 10, Act No. 15 of 1928.....	25	77	125	102	132	31	56	61	609
Ratio Percentage of Vaccinations Registered to Births Registered during the Year (after allowing for deaths of infants under two years).....	50.0	7.3	43.0	54.9	67.2	71.0	112.0	73.0	33.4

ANNEXURE F—(continued).

TABLE 3.—RE-VACCINATION OF TWELVE-YEAR-OLD EUROPEAN CHILDREN IN NATAL, YEAR ENDED 30TH JUNE, 1934.

Particulars.	Durban.	Pieter-maritzburg.	Remainder of Province.	Total.
Registration of twelve-year-old European children.....	1,356	489	1,353	3,198
Successfully vaccinated.....	1,200	429	1,367	2,996
Insusceptible to vaccination.....	96	21	194	311
Vaccination postponed owing to illness....	92	12	101	205
Previously had smallpox.....	—	—	—	—
Ratio percentage of vaccinations to twelve-year-old registrations.....	88·5	87·7	101·0	93·7

ANNEXURE G.

THE SOUTH AFRICAN MEDICAL COUNCIL.

RESUMÉ OF BUSINESS FOR THE YEAR ENDED 30TH JUNE, 1934.

Two special and two half-yearly meetings of the Council have been held as well as several meetings of the various standing committees. During the year the following registrations were effected:—

117 medical practitioners, 6 dentists, 186 medical students, 5 dental students, 440 nurses, 291 midwives, 3 masseurs and 31 dental mechanics. Of the nurses and midwives registered 397 of the former and 279 of the latter had obtained certificates of competency by passing the Council's examinations. The number of persons whose names appeared in the various registers on the 30th June, 1934, was as follows:—

Medical Practitioners	2,562
Dentists	709
Medical Students	814
Dental Students	33
Nurses	4,831
Midwives	3,095
Masseurs	38
Dental Mechanics	115

Registration of nurses, midwives, masseurs and dental mechanics is not compulsory and many complaints have been received from persons who are registered in one or other of those capacities of competition with unregistered persons. The Council, therefore, issued a circular to all medical practitioners and dentists urging the desirability of employing registered persons.

Examinations for nurses and midwives were held half-yearly. The table below shows the number of candidates who presented themselves for the various examinations and the number who passed.

		Presented.	Passed.
Medical and Surgical Nurses.....	Preliminary.....	491	384
	Final.....	300	297
Mental Nurses.....	Preliminary.....	113	89
	Final.....	101	76
Nurses for Mental Defectives.....	Preliminary.....	23	17
	Final.....	28	20
Male Nurses.....	Preliminary.....	16	6
	Final.....	5	4
Midwives.....		296	279

During the year the Council has proceeded with arrangements for issuing distinctive badges to nurses, midwives and masseurs and the first order has been placed with the Royal Mint. It is hoped that this badge will be generally adopted by the persons for whom it has been designed and serve to distinguish them from unregistered persons.

The Council has during the year received a large number of complaints against registered persons and all were fully investigated. Most were found to be a trivial nature and only three justified the holding of enquiries as provided by the Act. In two cases the persons complained of were found guilty and sentenced to be reprimanded under the hand of the President. In the third case the practitioner was found guilty of a grave offence and the Council ordered that his name be erased from the register. This case subsequently went to appeal but the Council's sentence was upheld.

The Council has also received complaints of alleged excessive charges by practitioners. With one exception the complaints were not established after preliminary investigation. In one case an enquiry as provided by Section 80 of the Act was held and the practitioner found guilty of the charge and reprimanded.

It was brought to the notice of the Council that certificates had been given by practitioners in a somewhat loose manner. A warning notice was therefore, issued to all medical practitioners of the consequences of giving certificates when they were not fully acquainted with the facts stated therein. The Council also issued a circular to all medical practitioners in regard to abortion this being considered advisable in view of correspondence on the subject which had appeared in the lay press.

Correspondence has been entered into with the General Medical Council of Great Britain in regard to the non-recognition by that body of diplomas in Public Health of South African medical schools and it is trusted that this will have a satisfactory result.

During the year the attention of the Council was drawn to the fact that persons were obtaining registrable qualifications in Great Britain and elsewhere on curricula part of which the Council was unable to say came up to the standard laid down by the Act. The Council therefore, submitted a recommendation to the Government that certain conditions must be fulfilled before any degree or diploma could be recognised under either Section 22 or Section 23 of the Act. Unfortunately the Government Law Advisers found these conditions to be *ultra vires* and the Council is now endeavouring to find some other solution of the difficulty.

The term of office of the first Council expired on the 31st December, 1933. A meeting of the newly constituted Council was held in January, 1934, and Dr. W. T. F. Davies was then re-elected President, Dr. S. M. de Kock, vice-President and Dr. A. W. Sanders, Treasurer.

ANNEXURE II.

THE SOUTH AFRICAN PHARMACY BOARD.

RESUMÉ OF BUSINESS FOR THE YEAR ENDED 30TH JUNE, 1934.

The usual half-yearly meetings of the Board were held in July, 1933, and January, 1934, and, in addition, two special meetings were held one being necessitated in December, 1933, owing to the term of office of the first constituted Board being about to expire.

During the period under review the registration of 76 chemists and druggists, of 23 managing directors of companies carrying on the business of chemists and druggists, and of 39 apprentices was effected. Of the persons registered as chemists and druggists 3 held the certificate of the Pharmaceutical Society of Great Britain, their registration being effected by virtue of the reciprocity agreement entered into with that body; the remainder held the qualifying certificate of the Board. On the 30th June, 1934, the names of 1,249 chemists and druggists, 105 managing directors, and 245 apprentices appeared in the Board's registers.

Among the most important functions of the Board are the registration of apprentices and their subsequent examination. Rules have from time to time been made by the Board and approved by the Government to ensure proper training for apprentices, and apprentices are not registered unless the Board is satisfied that the pharmacy in which it is proposed to employ them fulfils specified conditions. A high standard of examination has been laid down and, with the coming into operation of the 1932 edition of the British Pharmacopoeia the Board has appointed a sub-committee to revise the present syllabuses for its examinations. During the year 61 candidates have passed the Board's qualifying examination.

It has been laid down among the conditions which must be fulfilled by a pharmacy before a registered apprentice can be employed therein, that it must dispense a certain number of medical prescriptions. Many pharmacies are unable to satisfy this requirement owing, it is stated, to public bodies such as the South African Railways and Harbours Sick Fund requiring their medical officers to do their own dispensing. The Board feels that one of the avenues of employment for the youth of the country is being closed by the policy of these bodies and has made representations to the Sick Fund that in the larger towns dispensing should be done by chemists and druggists who would thus be able to employ registered apprentices.

The Board has for some time past considered the advisability of appointing an Inspector to see that the provisions of the Act, more especially those relating to poisons and habit-forming drugs, are being carried out. In view however of legal opinion that his powers would be extremely limited it has been decided not to proceed further with the matter. The Police authorities have proved most helpful to the Board and all alleged contraventions of the Act which have been reported to them have been investigated promptly.

A matter which has received the careful consideration of the Board is the registration of managing directors under Section 76 of the Act. It has felt that many of these persons are only directors in name and that they have been appointed for the sole purpose of enabling unregistered persons to carry on the business of chemists and druggists; by rule published during this year applicants for registration are now required to furnish the Board with the full terms of their appointment and, if these are not such as are proper for managing directors, the Board will, on legal advice, be entitled to refuse registration. The position is, however, not yet altogether satisfactory.

Many complaints have been received as to the number of certificates given by magistrates under section 51, Act No. 13 of 1928, to general dealers and the like to sell (a) poisons and (b) "patent", "proprietary" and "Dutch" medicines containing poisons. While the Board realises that the issue of certificates under (a) is at the discretion of a magistrate it is of opinion that every care should be taken in their issue in view of the large number of cases of poisoning—accidental and otherwise—reported in the Union. In this connection great difficulty has been experienced by the Police and others in ascertaining under existing regulations what poisons and preparations may be sold by general dealers. The Board has therefore prepared lists of these and it is trusted that they will be embodied in regulations to be made by the Government.

It is pleasing to report that while the Board received some reports as to professional misconduct of chemists and druggists these proved, on investigation, either to be without foundation or of such a minor nature as not to warrant the use of the Board's disciplinary powers.

The quinquennial term of office of the first Board expired on the 31st December, 1933, and fresh nominations were made by the Government and elections held in terms of the Act. On the representations of the Board a member was also appointed by the Government from the Schools of Pharmacy under Section 2 (7) of the Act. The Board as constituted for the period ending 31st December, 1938, is as follows:—

Messrs. J. Christie (President), W. Clancy (Vice-President), R. Macintosh (Treasurer), D. S. B. Anderson, W. A. J. Cameron, F. Carter, G. B. Christie, A. M. Fyvie, W. H. Millar and F. C. Willmot.

